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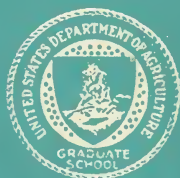


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# GRADUATE SCHOOL

UNITED STATES DEPARTMENT OF AGRICULTURE

## BULLETIN



GRADUATE AND UNDERGRADUATE STUDY

*Catalog Issue 1950-51*

WASHINGTON ~ AUGUST 1950

*This Bulletin, published annually by the Graduate School, covers graduate and undergraduate programs for the Fall and Spring Semesters and the Summer Session. It is made as accurate as possible, but the right is reserved to make changes in details as circumstances require. A bulletin on correspondence study is available to field employees of the Department of Agriculture.*

## Calendar for the 30th School Year, 1950-1951

### Fall Semester

- September 16—Registration begins
- September 23—Last day of registration without payment of extra fee
- September 25, Monday—Fall Semester begins
- September 25 to 29—All classes begin unless other date is given in Schedule of Classes
- October 1—Last day of registration for credit
- October 6, Friday—End of refund period and last day of registration transfer without payment of extra fee
- November 10—Last day to make deferred payments
- November 23, Thanksgiving holiday—No classes
- December 23, Saturday—Christmas holidays begin; no classes
- January 2, Tuesday—Classes resume after holidays
- January 15, Monday—Close of Fall Semester \*

### Spring Semester

- January 27—Registration begins
- February 3—Last day of registration without payment of extra fee
- February 5, Monday—Spring Semester begins
- February 5 to 9—All classes begin unless other date is given in Schedule of Classes
- February 16—Last day of registration for credit
- February 16, Friday—End of refund period and last day of registration, or registration transfer without payment of extra fee
- February 22, Washington's Birthday—No classes
- March 23—Last day to make deferred payments
- May 18, Friday—Close of Spring Semester \*

### Summer Session

- May 31—Registration begins
- June 2—Last day of registration without payment of extra fee
- June 4 to 8—All classes begin unless other date is given in Schedule of Classes

\* Classes which have missed sessions for any reason will continue until deficiency is made up.

Business Office—Room 1031, South Agriculture Building  
Between 12th and 14th on Independence Avenue, SW.  
Hours—9:00 A.M. to 6:20 P.M., Monday through Friday  
Telephone—Republic 4142, Extension 6337



GRADUATE SCHOOL  
UNITED STATES DEPARTMENT OF AGRICULTURE  
BULLETIN

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FALL — SPRING — SUMMER  
1950 — 1951



*Please keep this catalog for use in  
the Spring and Summer. New copies  
will not be available at that time.*

WASHINGTON ~ AUGUST, 1950

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## General Information

### WHAT THE GRADUATE SCHOOL COURSE PROGRAM OFFERS

From its beginning in 1921, the Department of Agriculture Graduate School has undertaken to give mature, intelligent students fundamental education of high quality as well as specialized education to increase their effectiveness in the Federal service. Courses range from cultural to technical, from seminars geared to meet the needs of the few to special series of lectures to attract and instruct the many not interested in regularly constituted courses. The program is developed and adapted in response to expert advice in what is needed to make a distinctive and needed contribution to the educational facilities of the Nation's Capital.

The School, in promoting the advanced education of Department employees, endeavors to adapt its training to the individual needs and interests of its students. This is true in the range of courses offered and in the methods of instruction followed. Graduate study continues to be the primary interest of the School, although the affiliated undergraduate program has now become larger in size. Courses are open to employees of other government agencies and to non-Federal persons to the extent that facilities permit.

### FOUNDING OF THE SCHOOL

The need for research and prolonged investigation grew with the expansion of governmental services in agriculture. In the evolution of the functions of the Department of Agriculture, scientists recruited directly from educational institutions created an intellectual climate conducive to development of post-entry education. With the emergence of a career system in government, greater emphasis was laid upon promotion from within the ranks. Paralleling these developments came the conspicuous need for further training of employees after entry into government service. So, with the recruitment of young men and women for career service in government, with personnel who had not completed their advanced education, with well educated newcomers to government service who needed the special "know-how" developed in government laboratories was crystallized the need for sound post-entry education.

As the need for qualified personnel became particularly acute after World War I, Congress, too, became cognizant of the fact that the quality of government service would depend greatly on the professional preparation of its employees. Consequently, the Con-

gressional Joint Committee on the Reclassification of Salaries recommended that the government departments give more attention to the development of opportunities within the Federal Service for continued education. Accordingly, in 1920, the Secretary appointed a special committee to explore the matter. After considering the committee's findings and consulting leading educational institutions and other government agencies, the Secretary, in establishing the Graduate School in 1921, announced: "I believe those who may be able to avail themselves of this opportunity will both enrich themselves and enhance the value of the service they render."

#### PURPOSE OF THE SCHOOL

The Graduate School exists to improve employee skills, knowledge and attitudes in the natural and social sciences and to extend facilitating educational opportunities to Department employees and to other qualified students.

Another primary purpose, unique in character, of graduate study in the Department of Agriculture has been the bringing together of the novitiates, the young and energetic scientists and technicians, so that they may profit from the large store of learning accumulated by the older men.

The growth of the Department's activities in variety and volume has been reflected in the development of the Graduate School. In coordinating and implementing the resources of the Department for educational needs,<sup>1</sup> the School has become a unique agency with two major roles. In the first role it functions as an educational service agency, dealing with programs for trainees and interns, cooperative undertakings and relations with land-grant and other institutions, arranging lecture series and rendering educational counseling.

In the second role, the Graduate School operates as an educational institution, providing course programs at various levels. These comprise a resident course program in Washington and a small correspondence program. The resident instruction program is the largest part of the Graduate School's current activities. It has grown from ten courses and approximately three hundred students to over three hundred courses and more than five thousand students. It is the resident program which this Bulletin describes for 1950-51.

<sup>1</sup> "United States Department of Agriculture Regulations Governing the Graduate School of the Department of Agriculture Promulgated Pursuant to the Authority Contained in the Act of May 15, 1862 (R. S. § 520 (1878), 5 U. S. C. § 511 (1940)), the Joint Resolution of April 12, 1892, 27 Stat. 395, and the Deficiency Appropriation Act of March 3, 1901, 31 Stat. 1010, 1039 (20 U. S. C. Sec. 91 (1940))." (Revised February 21, 1947.)



## ADMINISTRATION

The organization and administration of the Graduate School are simple and effective. The government of the Graduate School is vested in a General Administration Board appointed by the Secretary of Agriculture. Functions of this Board, made up of administrative and scientific officials of the Department, correspond in general to those of boards of trustees of universities. The Board sets policy, serves as the reviewing and approving authority in connection with the annual budget, and functions generally with respect to problems at this level. The School is administered by a director and a small administrative staff. It is a self-supporting non-profit institution and receives no Federal funds.

The committee system serves as the major means by which the Graduate School functions as a catalytic agent and clearing house for educational needs of the Department. The evening program in Washington is organized into eight departments. Each is under an appointed chairman and vice-chairman. These with other persons of broad background and recognized competence, appointed for two-year overlapping terms, comprise a departmental committee charged with responsibility for organizing, evaluating, readjusting, and giving general administrative direction to the programs and activities of the department concerned. Within the departments, depending on the scope and specialization of the programs involved, are divisional and related committees. The eight chairmen, and the Director, make up the Graduate School Council. Similar committees of experts operate with respect to other Graduate School programs.

## TEACHING AND RESEARCH RESOURCES

The Graduate School supplies some unusual opportunities for high-grade work. It is able to draw to its staff the best trained scholars in the Federal service, which is now a source of talent unexcelled in the nation. Many of these have had, in addition to governmental service, years of college and university teaching experience in the foremost institutions in the United States. As a result, the caliber of the teaching personnel of the School has been compared favorably with that of some of the best graduate institutions in the country. These persons also have had experience in making useful applications of their knowledge so that they can bring to bear on their respective subjects both theoretical and applied considerations.

The quality of the Graduate School staff is equaled by the library and laboratory facilities offered by Washington. In addition to a large library in the Department of Agriculture itself,

containing more than half a million volumes on both agricultural and non-agricultural subjects, students have ready access to the rich storehouse of the Library of Congress, the Smithsonian Institution, and the National Archives. Supplementing the Department Library as necessary, but merged with it, is a growing collection of books supplied directly by the Graduate School.

#### PUBLIC LECTURES AND SEMINARS

Lecture series on current problems serve Department employees and others by giving them an opportunity for closer acquaintance with the problems that are constantly arising, not only in the field of agriculture but in other national and world affairs. Those lectures which are especially geared to the needs and interests of Agriculture employees are given during official working hours. Registration is not required and no fees are charged. Information about lectures planned for 1950-51 will be found in sections of this BULLETIN devoted to the several departments of instruction. During the year, special announcements on these and other lectures will be issued.

#### COOPERATION WITH THE UNIVERSITY OF MARYLAND

To provide broader educational opportunities for those served by each institution, the Graduate School of the United States Department of Agriculture and the University of Maryland have developed a cooperative arrangement under which certain resources of each institution are made available to students of both institutions. Representatives of certain subject matter departments at each institution are engaged in developing integrated educational programs.

Under these arrangements, work taken at the Graduate School of the United States Department of Agriculture may be applied as partial residence credit toward undergraduate or advanced degrees at the University of Maryland. Those wishing to take advantage of this arrangement must work out an approved program of study in consultation with appropriate officials at the University of Maryland. This should be done at a point as early as possible in their programs.

Graduate School students wishing to take advantage of these opportunities may secure instructions from the Registrar.

#### COOPERATIVE INTERNSHIP PROGRAM WITH LAND-GRANT INSTITUTIONS

Post-graduate and post-doctorate personnel in Land-Grant Colleges and Universities are afforded opportunities for research and



for gaining other desirable experience under a program developed jointly by a committee from the Graduate Council of the Association of Land-Grant Colleges and Universities and the Graduate School. This work is under the direction of the Department of Agriculture professional staff in Washington, the Agricultural Research Center and elsewhere. Specific arrangements under this program are between personnel from these educational institutions and agencies in the Department. Details may be had from the Office of Personnel or the Graduate School.

### COUNSELING SERVICES

Careful planning is important for any prospective student, but particularly so for the Federal employee who wishes to make a substantial beginning in his educational program through the Graduate School, where degrees are not granted and credits must eventually be transferred to a degree-conferring institution.

Officers of the Graduate School are available, throughout the registration periods and from 9:00 a.m. to 5:00 p.m. each day for counseling on educational plans, whether courses are to be pursued in the Graduate School or in other institutions. In addition, where necessary, arrangements are made to refer persons having special problems to authorities in the particular field of work or study.

### GENERAL GRADUATE DEGREE REQUIREMENTS

The importance of a thoroughgoing, advance investigation of all the problems connected with acquiring a graduate degree cannot be overemphasized. A prospective graduate student needs to find out the residence, credit, language, and tuition requirements of all institutions in which he is interested. Furthermore, he should find out the standing of the particular department of the institution in which he expects eventually to take his degree.

The most vital single factor in studying for an advanced degree is the setting up of a program which includes a group of logically related courses in a special field of scientific or professional study. The wise student will make thoroughgoing preparation for such specialized study by completing the necessary fundamental introductory work which he may not have covered as an undergraduate. Unless his graduate courses are reasonably related to form an organic field of study, he may be sorely disappointed in the amount of credit which will be granted him when he transfers to another graduate school.

Although graduate schools usually set a minimum of three years' residence or classroom work as a standard for the Ph.D. degree,

meeting these time prerequisites does not guarantee a degree. No reputable graduate institution will grant a degree for a mere accumulation of course credit, however great. All good graduate schools place great emphasis on originality, creative research, independent thought, and disciplined judgment, as qualities desirable in candidates for the Ph.D. degree.

The greater number of graduate institutions require a reading knowledge of one foreign language before admission to the candidacy for the Master's degree, and a similar knowledge of two foreign languages, generally French and German, before admission to the candidacy for the doctorate. While instruction in the languages may have been gained anywhere, examinations to determine the candidate's language facility are usually given only by the institution where the student becomes a candidate for a degree. Finally, it is well to keep in mind the fact that it is an almost universal rule of graduate schools to require a grade of B or above to receive credit for graduate work.

It is imperative that every graduate student familiarize himself with the detailed rules of the institution where he expects to take his degree. He should consult freely both with the dean of the graduate school and with the head of the department in which he intends to do his major work.

Since the Graduate School of the Department of Agriculture does not grant degrees, the Federal employee who wishes to take an advanced degree should consult in advance the dean of the graduate school of the institution where he expects to become a candidate for his degree. This will enable him to plan his work ahead and to secure approval for whatever portion of it the institution of his choice will accept from the Graduate School. The student who is deficient in basic undergraduate courses needed as a foundation for his graduate program will find many of them available in the large undergraduate program of the Graduate School. Others may be obtained in local universities.

In laying out tentative programs, selecting individual courses, choosing institutions, or planning with other graduate schools, prospective students should always feel free to consult the Director, Assistant Director, or the Registrar of the Graduate School.

*Master's Degrees.* Degree-granting institutions will generally permit six semester hours of graduate credit to be transferred from another institution. Some institutions require that all study for the Master's degree be taken in residence.

*Doctor's Degrees.* Almost universal academic practice permits the graduate student to complete two of the three years' work necessary for the doctorate outside the degree-granting institution, or

a year beyond the Master's degree. Most students will find it advantageous to take the last year in residence.

*Undergraduate Deficiencies.* Graduate schools generally permit deficiencies to be made up out of residence.

*Language Requirements.* It is possible for graduate students to complete their preliminary language requirements in other institutions subject to optional examination by the degree-granting institution.

#### ACCREDITMENT

The Graduate School does not grant degrees and has never sought that authority; therefore it has not asked to be accredited by any of the accrediting agencies. It prefers to give courses of standard graduate and undergraduate grade; to have the merits of these courses judged by the caliber and well-known competence of its instructors; and to cooperate with existing institutions having degree-granting authority.

The United States Civil Service Commission accepts Graduate School credits, the same as those from accredited colleges and universities, for examination and qualification purposes.

#### CERTIFICATION

*Inclusion in Personnel Record for Department of Agriculture Employees.* To aid in effecting its promotion-from-within policy, the Department has provided (USDA Administrative Regulations, Title 8, Chapter 42, paragraphs 1548-1551, dated 10-13-48) that a record of Graduate School credits earned by its employees will be placed in official personnel files of the agency. Unless specifically requested by the employee that such action not be taken, the Graduate School will forward, upon completion of the courses or at the end of the year, a copy of the student's record, without cost to the employee, to the personnel officer of the administration, bureau or office in which the student is employed.

*Certification on Request.* Upon a student's written request, an informational record of his work at the Graduate School will be sent to him or to an organization designated by him. An official transcript of academic credit to be transferred to a college or university will be made only when the student has filed with the Graduate School a transcript of his previous academic work showing that he has met all requirements for admission to the level of the courses for which he registered.

### CERTIFIED STATEMENTS OF ACCOMPLISHMENT

Certified Statements of Accomplishment are offered in the fields of Accounting, Administrative Procedures, Agricultural Economics, Public Administration, and Statistics upon the student's completion of specified programs of study. Each student interested in earning a Certified Statement of Accomplishment in any of these fields should receive approval, from the Registrar, of his proposed program of study. For complete details see the outlined program in the Department concerned.

These statements are offered to encourage the student to complete a well-rounded approach to his chosen field of study or work, so that he may more competently discharge his present and prospective responsibilities as a public servant. Courses completed and the quality of accomplishment are recorded on the back of the statement which may be used as a personal record of achievement or a public record of qualification.

### GRADUATE SCHOOL PUBLICATIONS

Publications of the Graduate School include:

1. A general annual BULLETIN which contains detailed information about the resident educational program in Washington, D. C.

2. Time Schedule and Supplement, published each semester—fall, spring and summer—which carries added details about the resident educational program in Washington.

3. Books and periodicals, published at irregular intervals containing: original contributions by faculty members; special lectures on subjects devoted to the advancement of the arts, the sciences, and in particular to the development of literature in the field of better government; and significant manuscripts prepared by employees of the Department of Agriculture, which the Department has been unable to publish. A partial list of these publications is given on the outside back cover of this BULLETIN.

### ADMISSION

Admission to resident courses in the Graduate School is open to all qualified employees in the Federal service, and to such other qualified individuals as facilities will permit.

### VETERANS

Graduate School courses are available to veterans of World War II under the provisions of Public Laws 346 and 16 as amended. Registration for part-time study is charged against educational



benefits only in the proportion that the number of semester hours bears to a full normal load.

Veterans intending to enroll in the Graduate School should apply as soon as possible to the Regional Office of the Veterans Administration for an official certificate of eligibility and entitlement showing the amount of educational benefits to which they are entitled. This certificate of entitlement will be accepted by the Graduate School in lieu of tuition fees and charges for books and supplies.

In cases where an official certificate has not been received prior to the time of registration, the veteran will be required by the Graduate School to pay at least one half of his tuition plus whatever fees may be applicable, with the understanding that course fees will be refunded retroactive to the effective date on the letter of entitlement.

#### ENTRANCE REQUIREMENTS

Since the Graduate School does not offer degree programs, entrance requirements differ with the level of the course for which the student is registering.

#### COURSE PREREQUISITES

Undergraduate courses, in general, are open to persons who are graduates of a standard high school or equivalent or who qualify for the course because of satisfactory work experience. For admission to more advanced courses college work in the same or related field is specified or understood. For other courses definite prerequisites may be stated. Year courses require the completion of the work of the first semester or its equivalent.

#### COURSE LOAD

Students employed full time may not carry more than two courses. Should they wish to register for an additional course, permission must be secured from the Registrar.

#### CLASSIFICATION OF COURSES

1. The courses of study offered are classified according to aim, amount of advancement, or subject matter.
2. According to amount of advancement, some courses are for undergraduates only, others for undergraduates of sufficient maturity or graduates, and still others for graduates alone.

3. Courses are numbered according to degree of advancement of the course: below 100, non-credit; 100-399, undergraduate; 400-699, graduate and advanced undergraduate (senior); above 699, graduate.
4. The value of the course in semester hours is given below the course title.

### REGISTRATION REGULATIONS

*Registration.* Registration is during the periods scheduled in the School calendar, see inside front cover. Students will register in the School office, Room 1031 South Building, or in such other rooms as will be designated. After October 6 in the fall semester, February 16 in the spring, and June 11 in the summer, students may enroll for credit only with the approval of the instructor and the Registrar. Registration is not completed until the required fees have been paid. When the limitation set for each course is reached, registration for that course is closed. The Graduate School reserves the right to cancel any course if registration does not warrant continuance.

*Opening Date.* The thirtieth year of the Graduate School opens Monday, September 25, 1950. All classes begin during the week starting on that date. The fall and spring semesters run fifteen weeks each and the summer session ten weeks. Spring semester classes begin on February 5 and the summer session on June 4.

### FEES

*Course Fees.* In general, fees are computed at \$8.00 per semester hour credit for strictly undergraduate courses and \$9.00 per semester hour for graduate and advanced undergraduate courses.

*Late Fees.* There is a \$2 late registration fee and a \$1 late transfer fee as shown in the School Calendar.

*Reinstatement Fee.* Students who fail to meet payments when due are charged a reinstatement fee of \$2.00 per course in addition to all accrued fees.

*Laboratory Fee.* Laboratory or materials fees are listed in the Schedule of Classes for each semester, in connection with the courses for which they are charged.

*Service Fee.* A fee of \$1 per course is charged each student using the deferred payment plan.

*Transcript Fee.* There is a 50¢ fee for each copy of a student's record on the regular Graduate School form or on the form of another institution or state board of education.

## PAYMENT OF FEES

Fees are due and payable in advance at the time of registration. Registration is not complete and no student is permitted to attend classes until all fees have been paid. Enrollment constitutes an agreement on the part of the student to complete the course unless he meets the withdrawal requirements.

In exceptional cases, subject to the approval of the Registrar, the student may sign a contract permitting payment of one-half of the fees at the time of registration plus a \$1.00 service charge and the balance on or before November 10 in the fall semester, March 23 in the spring semester and July 6 in the summer session.

A student who fails to meet payments when due will be suspended and may not attend classes until he has been reinstated and has paid all accrued fees as well as a reinstatement fee of \$2.00.

All fees are payable at the Graduate School business office, Room 1031, South Building, United States Department of Agriculture.

## ATTENDANCE AT CLASSES

Students are expected to attend all class sessions and not to absent themselves without adequate reason.

Absences do not relieve the student from responsibility for work required while he was absent, and the burden of proof that the work was done rests with the student. In courses in which the work cannot be satisfactorily tested by written examination, the instructor shall be the judge of the relation of the student's attendance or non-attendance to his grade. All auditors, and other students carrying undergraduate courses who do not make up all required work, who are absent more than 25 per cent of the class periods will receive a mark of "W," withdrawn.

## CREDIT AND GRADES

*Academic Credit.* Persons registering for academic credit must satisfy all prerequisites for admission to the course as generally stated or specified in the course description.

*Audit.* An auditor must meet the same prerequisites as a credit student. He receives full privileges of class participation if he chooses to exercise them. An auditor does not receive a grade; he receives only a mark of AUD.

*Grades.* At the close of the semester students registering for credit receive written notice by mail of grades received. The following letter grades are used:

A	Excellent
B	Good
C	Fair
D	Passable
F	Failure
Aud	Auditor
Inc	Incomplete
W	Withdrawn

#### TRANSFER OF CREDIT

An official transcript of academic credit earned at the Graduate School will be made for each student requesting it if he has filed with the Graduate School a transcript of his previous academic work. This must show that the student has met all requirements for admission to the level of the courses for which he registered and for which he wishes official certification.

#### WITHDRAWAL

Withdrawals are permitted only under justifiable circumstances. A student who is obliged to withdraw from the Graduate School or from a course must immediately notify the Registrar, in writing.

Withdrawal from a course or from the Graduate School, without academic or financial penalty, requires the permission of the Registrar. Permission to withdraw and certification for work done will not be given to a student who does not have a clear financial record. Reporting the dropping of a course to an instructor does not effect its discontinuance nor constitute an official withdrawal.

Since commitments for instruction and other arrangements are necessarily made in the beginning of the semester, no refund of fees can be made except as herein indicated.

Withdrawals with refunds are permissible under justifiable circumstances upon written request of the student made within the refund period for each term on or before: October 6 in the fall semester, February 16 in the spring semester and June 11 in the summer session. When a student is granted permission to withdraw within this refund period, his fee minus a \$3.00 registration charge for each course will be refunded.

When a student is permanently transferred by official action out of the Washington area and he has been given permission to withdraw, his tuition fee, minus a \$3.00 registration charge for each course, will be refunded in the amount proportionate to the unexpired portion of the semester. No refund will be made of laboratory and other incidental fees. Written evidence of such trans-



fer must be presented. Permission to withdraw with refund will not be granted in cases arising out of the student's voluntary action.

All adjustments are made as of the date on which application for withdrawal with refund is received. In no case will tuition be reduced or refunded because of non-attendance in classes.

Students withdrawing under request from the Graduate School are not entitled to any return of fees.

### TEXTBOOKS

The Graduate School maintains a bookstore, for the convenience of the students, in Room 1041, South Agriculture Building. Students are urged to purchase their books at the time of registration or soon thereafter. The book store is open afternoons and evenings during registration and the first week of school; and from 4:30 to 5:30 p.m., Monday through Friday, during the remainder of the semester.

### ROOM ASSIGNMENTS

Classroom assignments, insofar as practicable, will be given the student at the time of registration. Classroom assignments, not available at the time of registration, will be posted the week that classes begin on bulletin boards outside of Room 1031, and in the north entrances of the fourth and seventh wings, of the South Building, United States Department of Agriculture.

—O—

The Graduate School reserves the right to cancel any course if registration does not warrant continuance; to discontinue, postpone or combine classes; to change instructors; to make any changes deemed advisable in registration and in fees; and to require the withdrawal of any student at any time for such reasons as the School deems sufficient.

# Department of Biological Sciences

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EDWARD H. GRAHAM (Vice-chairman)

WILLARD H. WRIGHT

E. L. LECLERG

DANIEL L. LEEDY

O. E. REED

—O—

Many government workers in fields only indirectly related to biology often need an understanding of basic principles in the biological sciences to do a competent job in their own fields. On the other hand, government workers in the biological sciences are continually faced with the problem of keeping abreast of the rapid advances in the application of these principles and new gains in basic knowledge. The Department of Biological Sciences has arranged a series of courses to meet the needs of each of these groups. These courses are taught by outstanding specialists from Federal and other research institutions. To permit wide discussion, courses for advanced students are arranged as seminars.

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*Course Numbers and Symbols*—Below 100, non-credit; 100–399, undergraduate; 400–699, graduate and advanced undergraduate (senior); above 699, graduate. Bracketed numbers, not given this year.

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[101.] **General College Zoology** (1951–52 and alternate years)

HENRY W. OLSON

[102.] **General College Botany** (1951–52 and alternate years)

HENRY W. OLSON

## 250. **Bacteriology**

Fall, 4 credits (alternate years)

HENRY W. OLSON

A study of the morphology and physiology of bacteria. Training is given in the preparation of various culture media, in methods of sterilization, in staining techniques, in the cultivation and identification of bacteria, and in standard methods of water and milk analysis. The class meets in the Biology Laboratory of Wilson Teachers College, 11th and Harvard Sts., N. W. *Prerequisite:* College botany or equivalent.

**320. Human Physiology**

Spring, 4 credits (alternate years)

HENRY W. OLSON

A course in human physiology intended to give the student a basic knowledge of the structure and functions of the systems of the body: the circulatory, respiratory, digestive, nervous, skeletal, reproductive, and endocrine. The laboratory work includes dissection of organs, experiments on digestion, nutrition, the nervous system, sense organs, microscopic examination of tissues, and has been planned to give the student a better understanding of the methods of scientific investigation. The class meets in the Biology Laboratory of Wilson Teachers College, 11th and Harvard Sts., N. W. *Prerequisite:* College zoology or equivalent.

**[209.] Systematic Botany—Principles of Classification (1951–52 and alternate years)**

SIDNEY F. BLAKE

**[210.] Systematic Botany—Identification Techniques (1951–52 and alternate years)**

SIDNEY F. BLAKE

**213. Identification of Local Plants**

Summer, 2 credits

EGBERT H. WALKER

An elementary course, with no prerequisites, dealing with the process of determining the names of the plants, both wild and cultivated, trees, shrubs, herbs and wild flowers, of the vicinity of Washington, D. C. The work will include discussion of the books and keys to the plants, the language they are written in, and how to use them. Most of the work will be with actual plants, largely those brought in by the students or gathered on class field trips. Instruction and demonstration will be given in the methods of pressing, drying, and mounting plant specimens.

**214. Birds of the Washington Area**

Summer, 2 credits

CHANDLER S. ROBBINS

Introduction to birds of the District of Columbia region, stressing field identification, but touching on classification, distribution, migration, nesting, ecology and research methods. Museum collections of birds will be inspected and recordings of bird songs will be available in addition to the field trips.

**300. Fundamentals of Entomology**

Spring, 3 credits (alternate years)

REECE I. SAILER

An introductory course designed to provide the student with the basic elements of entomology. Recognition of the principal orders of insects and their important families is stressed. A study of the terminology and identification with the anatomical structure of insects. Attention is given to the biology of insects and to their phylogenetic and ecological relationships to other organisms. Lectures, discussion, laboratory and Saturday morning field trips. *Prerequisite:* Basic training in biology or consent of instructor.

**719. Resource Utilization Problems and Policies**

(See p. 88)

**[512.] Medical and Veterinary Entomology (1951–52 and alternate years)**

F. C. BISHOPP

**518. New Developments in Insecticides**

Fall, 2 credits (alternate years)

F. C. BISHOPP and SPECIALISTS

Specialists in the field of insecticides will discuss various aspects of this subject which has advanced so rapidly during and since World War II. The chemistry of insecticides, their manufacture, pharmacology, compounding, methods of application, and equipment will be treated. Discussions will include the usefulness of insecticides in protecting man, clothing, buildings, houses, livestock, gardens, fruit, field crops, forests, and stored products from insect attack. Practical problems involved in the use of various insecticides and fumigants will be studied and recent applicable literature will be cited. *Prerequisite:* Basic courses in biology or chemistry, or consent of instructor.

**[519.] New Developments in Fungicides (1951-52 and alternate years)**

JOHN C. DUNEGAN, M. C. GOLDSWORTHY and SPECIALISTS

**620. Advances in Weed Control Practices**

Spring, 2 credits (alternate years)

R. L. LOVVORN, LEWIS S. EVANS and SPECIALISTS

A presentation of theoretical and practical aspects of weed control in relation to agricultural economy, including classification, distribution, development, and destruction of weeds; the description and classification of herbicidal compounds; and control by mechanical, biological, and competitive cropping practices. Attention will be given to methods of weed control in field crops, horticultural crops, lawns and turf, and in special situations including non-agricultural lands, irrigation systems, etc. *Prerequisite:* A basic knowledge of plant physiology or related subjects.

**[603.] Advances in Plant Breeding and Genetics (1951-52 and every third year)**

F. J. STEVENSON and SPECIALISTS

**608. Advances in Human and Animal Nutrition**

Spring, 2 credits (alternate years)

PAUL E. HOWE and SPECIALISTS

A seminar on nutrition of man and animals, specifically and comparatively. The effect of variations in the development of animals and plants on nutritive value and changes resulting from processing. The reactions of man to food as it influences the nutrition of man. *Prerequisite:* Basic training in nutrition or consent of instructor.

**[609.] Recent Developments in Plant Physiology (1951-52 and alternate years)**

FRANK P. CULLINAN and SPECIALISTS

**610. Recent Developments in Plant Nutrition**

Fall, 2 credits (alternate years)

MARION W. PARKER and SPECIALISTS

A seminar on recent developments and fundamental principles of plant nutrition. Topics to be treated will include culture of plants under aseptic conditions, sand culture, nutriculture including subirrigation techniques, and nutrition of orchard and field crops. *Prerequisite:* Basic training in plant physiology or related fields.

**700. Progress in the Field of Antibiotics**

Fall, 2 credits (alternate years)

GEORGE W. IRVING, JR., THOMAS D. FONTAINE and SPECIALISTS

Present status of the chemistry, production and medicinal value of penicillin and streptomycin will be reviewed. Other lecture topics will include discussion of new antibiotics from molds, bacteria, yeasts, and green plants. *Prerequisite:* Work in antibiotics or in related fields.

**[701.] Virus Diseases of Man and Animals (1951-52 and alternate years)****702. Radioisotopes and High Energy Radiation in Biology**

Spring, 2 credits

B. T. SHAW, STERLING B. HENDRICKS and SPECIALISTS

Principles involved in the production and measurement of high energy radiation and radioisotopes will be discussed as a background for application to biology. Applications will deal with the effects of radiation on living systems, and use of isotopic tracers in study of biochemical mechanism and plant nutrition. Guest lecturers will discuss special topics. *Prerequisite:* Professional training in biology, chemistry or physics.



# Department of Languages and Literature

## DEPARTMENTAL COMMITTEE

RALPH R. SHAW (Chairman)

GEORGE E. BEAUCHAMP

J. P. BLICKENSERFER

JAMES O. HOWARD

ERWIN JAFFE

J. KENDALL McCLARREN (Vice-chairman)

LESTER A. SCHLUP

FRANKLIN THACKREY

R. LYLE WEBSTER

## IMPORTANCE OF ENGLISH, WRITING AND SPEECH

Among students preparing for technical careers and among busy people employed on the basis of their technical competence, there is an inevitable tendency to concentrate on subject-matter specialties, to the great neglect—if not exclusion—of the auxiliary subjects that can effectively implement such specialties. It is common knowledge in the Government service that nothing so much retards the progress of many young technicians, scientists, and other professional personnel as their inability to incorporate the results of their thinking and of their research in effective, concise, lucid English, written or oral. Technical knowledge is of no value unless it can be communicated to others. There are indeed few persons who cannot greatly benefit from the further sharpening of their tools of communication.

—O—

*Course Numbers and Symbols*—Below 100, non-credit; 100–399, undergraduate; 400–699, graduate and advanced undergraduate (senior); above 699, graduate. Bracketed numbers, not given this year.

—O—

## ENGLISH AND LITERATURE

### 222<sup>a</sup>. English Composition

Fall, 3 credits. Repeated in Spring and Summer

FRANCES H. MILLER

Equivalent of freshman English. An introductory course in writing and English usage, designed especially for those who need a course preparatory to more advanced English studies. Special attention given to the fundamental principles and mechanics of good writing—grammar, punctuation, spelling, diction, etc. Exercises in writing short and long themes and in studying, analyzing, and evaluating selected English prose texts.

### 222<sup>b</sup>. English Composition

Spring, 3 credits

EVELYN K. TENNEY

Continuation of course 222<sup>a</sup> above.

## 223. Descriptive English Grammar

Fall, 2 credits. Repeated in Spring and Summer

SUSAN E. HARMAN  
JAMES G. HARMON

A course in the study of grammatical principles, stressing sentence structure and correct English form. Lectures on the history and development of inflectional and derivational forms. Exercises in diagramming and in analyzing examples of good and bad English.

## 118. Practical English Usage

Fall, 2 credits. Repeated in Spring and Summer

CHARLOTTE MANGOLD  
VERNE L. SAMSON

This course enables students through practice to master the fundamentals of correct English. Troublesome problems of English usage, sentence structure, choice of words, style, and grammar, are studied as aids to clear and forceful writing of letters, memoranda, and reports.

## 119. Vocabulary Building

Fall, 2 credits. Repeated in Spring and Summer

CHARLES D. MURPHY

Designed to help writers and speakers express ideas clearly and attractively. It embraces word study and selection, diacritical markings, synonyms and antonyms, prefixes and suffixes, usage exercises, and other means of developing a broad and useful command of words.

## 330. Great Books

Year, 2 credits each semester \*

M. CLARE RUPPERT

Group discussion, under leadership, of important works in poetry, history, philosophy and criticism. The leader will try to help with the reading and understanding, but the books themselves will be the teachers. The intention of the course is to give insight into perennial, and therefore contemporary, problems, not historical and literary information. The only qualifications required are an interest in ideas and belief in free discussion. With few exceptions the books will be read in their entirety. One, two, or three meetings will be given to a book depending upon its length. Discussion will center around the following authors:

*Fall Semester:* Homer, Sophocles, Aeschylus, Thucydides, Herodotus, Plato, Aristotle, Lucretius, Tacitus, Marcus Aurelius, Augustine, Thomas Aquinas.

*Spring Semester:* Dante, Machiavelli, Shakespeare, Cervantes, Bacon, Hobbes, Rousseau, Swift, Goethe, Kant, Marx, Henry Adams.

## 310. Survey of Great Plays

Year, 2 credits each semester \*

ALICE S. VENEZKY

A survey of the world's great plays, their philosophical backgrounds, contemporary significance, and dramatic technique. Aim of the course is to develop critical ability, dramatic appreciation, and an understanding of the main currents of thought from classical to modern times. The following plays are studied in the first semester: Aeschylus, *Agamemnon*; Sophocles, *Oedipus Rex*; Euripides, *Medea*; Aristophanes, *The Frogs*; Plautus, *The Captives*; Terence, *Phormio*; Calderon, *Life is a Dream*; Marlowe, *Faustus*; Shakespeare, *Julius Caesar*, *Macbeth*; Moliere, *Tartuffe*; Racine, *Phaedra*; Goethe, *Faust*. The second semester includes plays by Henrik Ibsen, Anton Chekhov, August Strindberg, George Bernard Shaw, Oscar Wilde, Eugene O'Neill, Maxwell Anderson, Jean Giraudoux, Arthur Miller, Tennessee Williams and T. S. Eliot.

\* Students may attend both semesters or either semester.

**235. Fiction Writing**

Fall, 2 credits

HAROLD E. CHRISTIE

Stresses such fiction fundamentals as plotting, characterization, dialogue, story organization, testing readability and interest, and increasing dramatic quality of writing. Emphasizes writing techniques which increase salability of student manuscripts by discussing editorial taboos, ways to obtain salable story ideas, and methods of marketing manuscripts. *Prerequisite:* English Composition or equivalent, or permission of instructor.

**242. Fiction Writing Workshop**

Spring, 2 credits

HAROLD E. CHRISTIE

Discussion, criticism and suggestions for revising student manuscripts. Emphasizes methods of slanting for particular markets, discussions of what editors buy and why, and ways to polish manuscripts to increase sales possibilities. *Prerequisite:* Fiction Writing or equivalent.

**280. Feature Writing**

Fall, 2 credits

HAROLD E. CHRISTIE

Stresses how to find article ideas, how to do the research necessary to develop them into salable articles, best methods of presentation of material, ways to polish writing to make it more salable, ways to determine magazine needs, how to slant material for particular magazines, and how to test readability and interest of writing. *Prerequisite:* English Composition or equivalent, or permission of instructor.

**281. Feature Writing Workshop**

Spring, 2 credits

HAROLD E. CHRISTIE

Discussion, criticism and suggestions for revising student manuscripts. Emphasizes methods of slanting for particular markets, discussions of what editors buy and why, and ways to polish manuscripts to increase sales possibilities. *Prerequisite:* Feature Writing or equivalent.

**SPEECH****228. Fundamentals of Speech**

Fall, 2 credits. Repeated in Summer

VIRGINIA B. ROSER

Through the preparation and delivery of short original speeches the student gains poise, assurance, and the ability to express himself clearly and accurately. Strict adherence to time limit quickens mental processes and develops discrimination in the selection of speech material. Voice, articulation, and pronunciation drills. Posture, movement, and gesture. Learn to speak by speaking at each class meeting. Constructive criticism.

**229. Public Speaking**

Spring, 2 credits

GEORGE E. BEAUCHAMP

Theory and practice of effective speaking through: (1) audience analysis, (2) organization of speech material to achieve a specific response, (3) delivering speeches for special occasions (radio, good will, welcome, presentation, acceptance, etc.), (4) planning an interesting and dramatic meeting, (5) officiating at banquets. Each student speaks at every class meeting. It is assumed that the student has some knowledge or experience in speech making.



### 400. Effective Speaking

Fall, 2 credits

GEORGE E. BEAUCHAMP

A course designed for persons who have previously had a beginning course or some practical experience in public speaking. Special attention is given to types of speeches, organization and writing of speeches, and effective delivery.

### 567. Principles of Persuasion

Spring, 2 credits

GEORGE E. BEAUCHAMP

Human motivation as exemplified in basic principles of persuasive thinking is analyzed and practiced in speeches and letters; the influence of emotion, rationalization, stereotypes, prejudice, and the will-to-believe are stressed.

### 232. Voice and Remedial Speech

Fall, 2 credits. Repeated in Summer

WALTER B. EMERY

Study and intensive drills in voice production, flexibility, range, articulation, and enunciation. Training and practice are designed to improve vocal conditions for all speech purposes and to remedy minor speech difficulties. In order that students may receive more individual attention, registration is limited to twenty.

This course is intended to improve the normal voice and minor speech difficulties. Prospective students with major speech difficulties are urged to enroll in the Speech Clinic.

### 234. Correction of Speech Dialect

Spring, 2 credits

WALTER B. EMERY

Designed for persons having local or foreign dialect wishing to acquire standard American pronunciation and speech; intensive phonetic studies and drills to help the student hear properly and produce correctly American speech sounds and to avoid deviations therefrom; special reading and speaking exercises to improve diction and conversational ability; training is designed to serve individual needs.

### 50. Speech Clinic

Fall, non-credit. Repeated in Summer

WALTER B. EMERY

A speech clinic has been organized as a service to Graduate School students. The clinic is designed to help correct serious abnormal speech disorders. Private consultation and practice with instructor 20 minutes per week for 15 weeks. Schedule of evening or Saturday appointments to be arranged with the instructor. Limited to 8 students.

## INFORMATION METHODS

### 247. News Writing

Spring, 2 credits

RICHARD S. FITZPATRICK

What news is; structure of the news story; writing the news story; news story style. The role of the reporter; the reporter as a specialist. Objectivity in the news story; interpretation and explanation in the news story; backgrounding the news; readability in news. Handling of news stories by newspapers, press associations and news magazines. News writing for radio. Libel. Use of the news story in public information programs. *Prerequisite:* English Composition or equivalent, or permission of instructor.

**320. Introduction to Public Information Media**

Fall, 2 credits

RICHARD S. FITZPATRICK

Presenting to the public current, accurate, objective information is essential in democratic government. The course will include a review of the interrelation of public opinion, public interest and public information; the importance, potentialities and issues of mass communication; evaluation of the use and effectiveness of newspapers, magazines, books, radio, facsimile, television, motion pictures, and advertising as channels of public information; limitations on the effectiveness of mass media; propaganda and censorship; and mass communication in the international field. Opportunities in public information as a profession will be discussed. *Prerequisite:* Background in any social science or practical experience in editorial or informational work.

**710. Government Public Relations**

(See p. 69)

**240. Audio-Visual Aids in Information and Education**

Fall, 2 credits

SEERLEY REID and R. LYLE WEBSTER

A survey of the many ways audio-visual aids can be used in training, employee relations, and information and education programs. Covers not only newer materials such as motion pictures, filmstrips, and recordings, but also modern uses of photographs, charts, graphs, maps, and the like—even the art of using a blackboard. Gives practical suggestions on the most effective use of these aids for different purposes—developing physical skills, imparting information, changing attitudes, and otherwise influencing human behavior. Lectures and demonstrations with guest speakers presenting material on special topics. Each student will have the opportunity to choose his own problem for intensive study.

**225. Principles of Editing and Their Application**

Fall, 3 credits

ROY E. MILLER and SPECIALISTS

Limited to 40 students.

Intended primarily for those seeking information on editorial techniques involved in handling manuscripts after they leave the author's hands and until they are issued in printed form. Discussion of the fundamental principles of editing, including the organization or rearrangement of material for effective presentation; rhetorical style in relation to subject matter; word forms, sentence structure and effective use of English; the Style Manual of the Government Printing Office; considerations governing titles, tables of contents, headings, footnotes, illustrations, literature citations and bibliographies, and statistical checking; the principles of table formation and arrangement; the relation of type to subject matter and the techniques of printing; and the fundamentals of indexing and proofreading. Opportunity is afforded to apply these principles in practical work in editing, which is then discussed in class. A trip to the Government Printing Office is arranged to note and study operations there.

**360. Advanced Practice in Editing**

Spring, 2 credits

GENIANA R. EDWARDS and SPECIALISTS

Advanced instruction in literary and statistical editing and the preparation of tables. The class will work on editorial material provided by the instructor or submitted by the students. *Prerequisite:* Principles of Editing and Their Application or consent of the instructor.

**226. Introduction to Official Writing**

Fall, 2 credits

J. KENDALL McCLARREN and MARGUERITE GILSTRAP

This course covers the principles of clear statement that must be applied to all forms of writing. Emphasis is given to the special requirements of offi-

cial writing within the boundaries of economic and scientific research, government organization, and official policy. Frequently these limitations lead to a style that is wordy and lifeless. The course, which presupposes some writing experience, considers ways of making official writing clear, vigorous, and readable in spite of the necessary rules and restrictions. One major writing project is required.

## 250. Interpretive Writing on Official Action

Spring, 2 credits

J. KENDALL MCCLARREN and MARGUERITE GILSTRAP

This course presents informally the elements of explaining official activities through newspaper releases, magazine articles, printed reports, radio scripts, and other public media. The workshop method is followed so far as practical with practice in the preparation of background and interpretive material on government research, programs, and policies. *Prerequisite:* Introduction to Official Writing or equivalent.

## 305. Radio—Writing and Speaking

Spring, 2 credits (alternate years)

E. J. ROWELL

This course is designed for those who are interested in broadcasting the human voice, pointing up the desirable qualities which make for radio broadcasting. A condensed study of our two languages, that for the ear and that for the eye, will be made. Preparation and presentation of talks, interviews and conversations, including exercises in voice control and microphone techniques.

## [440.] Television Programing (1951–52 and alternate years)

KENNETH M. GAPEN, MAYNARD A. SPEECE and THOMAS M. NOONE, JR.

## 200. Readable Writing

Spring, 2 credits (alternate years)

AMY G. COWING and HARRY MILEHAM

Teaches you how to write so that more people will read and understand your articles and bulletins; how to estimate how easy or hard the reader will find your writing; how to organize your writing for easy reading. Deals briefly with the use of pictures and other visual aids to reading. Much of the course centers around use of the Flesch Readability Formula and consists of lectures and workshop sessions in which students make practical application of writing principles.

## 120. Indexing

Fall, 1 credit

MABEL H. DOYLE

This course is intended primarily for those interested in making indexes for periodicals, bulletins, reports, and books. Emphasis will be placed on general procedures and matters of policy as well as on basic principles and techniques. Specific types of indexing adapted to various subjects and popular style, contrasted with technical and scientific styles, will be studied. Examples of different kinds of indexes will be shown and opportunity given for practical work in the preparation of indexes, including the making of cross references, alphabetizing, and editorial preparation of index cards and manuscripts for the printer.

## 237. Government Printing Procedure

Spring, 2 credits

LOUIS H. ANDERSON

Intended for those who plan, prepare, or procure printing, duplicating, and distribution of books, pamphlets, folders, posters, charts, forms and other printed or duplicated matter. Subjects covered include: analysis of manuscript copy and its purpose to determine format and method of production; organization of copy for effectiveness; copy fitting and measuring; ways to aid the reader to grasp the

message of the printed word; legibility and readability; type faces and typography; illustrations; printing and duplicating processes and criteria for their use; paper; binding methods; preparation of copy for duplicator and printer; handling of proofs; specifications and cost factors; and channels and methods of distribution of Government publications. The knowledge of methods and procedures to be acquired from this course is intended to give the student competence and confidence in dealing with author and editor, and printing, duplicating and distribution technicians.

## 75. Introduction to Library Techniques

Year, non-credit

MARY C. DEVEREAUX

Emphasis on methods and techniques used in processing the books in libraries: order and accession records, cataloging and classification records, circulation records, shelf list, filing inter-library loan records, introduction to general reference books. Actual work with books, records and filing.

## 551. Libraries As Intellectual and Research Resources

Fall, 1 credit

FOSTER MOHRHARDT and SPECIALISTS

Recent war and post-war experiences have shown that libraries, in addition to assembling important warehouses of information, have also developed unique techniques, methods and services that are of fundamental importance in all modern intellectual activities.

This symposium is organized to provide a meeting ground for librarians and for those who use the library's intellectual resources. It is planned to divert the interest of librarians from their concern with techniques and details to the broader aspects and responsibilities of their profession. The course is designed to aid in the development of a modern philosophy of librarianship. Topics to be covered: international relations and libraries; the library's contribution to literary endeavor; how libraries can assist in scientific advancement; machines and libraries; the twentieth century arts and libraries; documentation; libraries and the social sciences; libraries as educators. Detailed information about this series of lectures, including a complete list of topics and speakers, will be available at time of registration. *Prerequisite:* Degree in Library Science, or equivalent professional experience.

## FOREIGN LANGUAGES

The unprecedented expansion of international activities has greatly increased interest in the study of foreign languages. Research workers, those employed in all aspects of international relations, and those scheduled for foreign assignments are in need of foreign-language instruction. With the expansion of international land, water and air transportation many persons find it desirable to improve their facility of speech in some foreign language before visiting our world neighbors.

The Graduate School provides opportunities for instruction in a wide range of foreign languages. The person who is seeking the maximum practical value from a foreign language must learn not only to translate it but to think in it well enough for translation to be unnecessary. It is the aim of those responsible for these courses to conduct them so as to develop in their students a ready and intelligent use of the language.



## INTENSIVE LANGUAGE INSTRUCTION

The Department of State is authorized to provide language training, through the Foreign Service Institute, for Federal employees who are certified by their agencies as requiring language training to perform necessary duties in connection with definite foreign assignments. Upon written certification by the agency, official arrangements may be made to place such persons in one of the regular intensive language classes offered by the Foreign Service Institute, depending upon the availability of facilities. Such training will be given on official time at no cost to the student. Department of Agriculture employees may secure information about this program from the Registrar. Persons from other Departments may secure information from the Registrar or directly from Dr. Henry Lee Smith, Jr., Foreign Service Institute, Department of State.

## DIRECTED LANGUAGE STUDY

Groups of students desiring instruction in any language not scheduled in this BULLETIN or in a specialized scientific field are requested to notify the Graduate School of their interest. If a sufficient number are interested, an instructor will be secured and all necessary arrangements made to offer the course.

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Unless otherwise specified, all foreign language courses are organized as follows:

*Elementary year*—foundation work in grammar, vocabulary, reading, and translation, with some conversation.

*Intermediate year*—grammar review, more difficult reading and translation, use of idioms, writing and discussion in the language.

*Conversation*—development of facility in discussion and reading, use of idioms, writing and thinking in the language without translating.

## FRENCH

**253. Elementary French**

Year, 3 credits each semester. Repeated in Spring

JACK C. ARNOULD  
HENRI DE MARNE

**254. Intermediate French**

Year, 3 credits each semester

JACK C. ARNOULD

**255. French Conversation**

Year, 2 credits each semester

HENRI DE MARNE

## GERMAN

**259. Elementary German**

Year, 3 credits each semester. Repeated in Spring

MARIANNE LEDERER  
JOSEPH PONTI**260. Intermediate German**

Year, 3 credits each semester

MARIANNE LEDERER

**[261.] German Conversation**

MAGNA E. BAUER

**[262.] Advanced German**

JOSEPH PONTI

**264. Scientific German—Economic Terms**

Fall, 2 credits

MAGNA E. BAUER

Economic terms and concepts in the German language are explained, translated and discussed. The course is designed to increase the student's vocabulary of German terms used in economic theory and literature in some of the specialized fields of economics, so as to guide him in the analysis and proper translation of accepted or unusual terminology. *Prerequisite:* Reading knowledge of German, equivalent to two years of intensive study.

## ITALIAN

**270. Elementary Italian**

Year, 3 credits each semester

ALARIC EVANGELIST

**[271.] Intermediate Italian**

## RUSSIAN

**295. Elementary Russian**

Year, 3 credits each semester. Repeated in Spring and Summer

GEORGE M. KORENEV ROCKWELL  
ERIC T. SCHULER  
EUGENIA TARAKUS**296. Intermediate Russian**

Year, 3 credits each semester

GEORGE M. SAHAROV

**299. Advanced Russian**

Year, 3 credits each semester

GEORGE M. SAHAROV

**45. Review of Elementary Russian**

Summer, non-credit

GEORGE M. SAHAROV

General review of Russian grammar, accompanied with oral and written exercises. *Prerequisite:* A year course in elementary Russian, or the equivalent as approved by instructor.

## SPANISH

### 300. Elementary Spanish

Year, 3 credits each semester. Repeated in Spring and Summer

ERWIN JAFFE  
GLORINA PANIAGUA

### 301. Intermediate Spanish

Year, 3 credits each semester

JOSE GARCIA-TUNON

### 302. Spanish Composition and Conversation

Year, 2 credits each semester

G. MEDRANO DE SUPERVIA

Thorough training in the structure of the language, through reading and discussion of Spanish newspapers, magazines and novels of today. Writing of compositions, commercial and familiar letters; helping student acquire ability to speak and understand everyday and colloquial Spanish. *Prerequisite:* Intermediate Spanish or equivalent.

### 574. Advanced Spanish Conversation and Literature

Year, 2 credits each semester

RAFAEL SUPERVIA

Especially adapted for those having a fair knowledge of the Spanish language, who want to improve it by the readings of and comments on the masters of Spanish literature. *Prerequisite:* Ability to read, understand, and express oneself clearly in Spanish.

### 47. Everyday Spanish

Summer, non-credit

JOSE GARCIA-TUNON

Accuracy and facility in the use of oral Spanish will be attempted through the use of dictation, conversation, and other devices. The work will be adapted to those entering the course. The course is designed especially for those who wish to acquire fluency in the spoken language of today. *Prerequisite:* One year of Spanish.

# Department of Mathematics and Statistics

## DEPARTMENTAL COMMITTEE

W. EDWARDS DEMING (Chairman)

JOHN H. CURTISS

JOSEPH F. DALY

HAROLD F. DORN

MARGARET J. HAGOOD

MORRIS H. HANSEN

B. R. STAUBER (Vice-chairman)

O. C. STINE

## THE STATISTICIAN AND HIS EDUCATION

Unprecedented dependence is being placed on statisticians by administrative officials in government and private business all over the world. The statistician, through his specialized training, is able to provide current and comprehensive information on many subjects, and to do so with speed and economy.

Competent statisticians are accordingly in great demand, in government, business, and for teaching positions in the universities; the demand will exceed the anticipated supply for many years. The making of a statistician is a long and exacting process—several years of graduate study, plus at least a year and a half of high-grade experience under competent leadership. Educational facilities are strained, not only because of the heavy and increasing demand but also because the educational requirements placed on the statistician today are of an entirely different order of magnitude than they were a few years ago.

The opportunities offered in Washington for statistical education are unsurpassed, particularly with regard to work-experience and theory of modern sample-design. The advanced courses offered by the Graduate School are intended to supplement the statistical studies obtainable in universities. Further supplementation is provided through the internship plan (see page 35), by which practical experience in all aspects of sampling can be gained along with theory.

Statistical training is recognized as a necessary adjunct in such fields as engineering, biology, agricultural science, business, sociology, economics, public opinion, and other branches of the natural and social sciences. Training in these professions is now regarded as incomplete without mathematical and statistical studies, through intermediate grades at least. Courses are offered by the Graduate School to provide this kind of training.

The statistician is particularly equipped by training and experience to assist in the formulation of scientific courses of action in government, manufacturing, and distribution. He must know when data are needed and how much precision is required, and what the cost should be. He is expected to be expert in the collec-



tion, analysis, interpretation, and presentation of quantitative information. He may be called upon to administer a statistical organization. He must therefore be familiar with problems of classification and definition. He is expected to be expert in the design of questionnaires and sampling procedures, and must therefore know field-work and costs. The courses described on the following pages accordingly provide training not only in theoretical principles, but training also in the administrative and research uses of data, as well as in the collection and processing of data and in the development and supervision of the minor skills necessary for carrying out statistical work.

In the design of a survey the statistician is concerned with the reliability and the cost of the figures that are to be obtained. Reliability is affected by many sources of error, which can be classified under two groups: (a) biases that are common to both complete counts and samples; (b) sampling errors. A thorough understanding of both types of error is essential in the work of the statistician. The statistical courses listed on the following pages deal mainly but not entirely with sampling errors. Proficiency in one or another branch of subject-matter such as sociology, economics, agricultural science, engineering, or some other specialized field, is essential for a full appreciation of the first type of error and for that reason collateral studies in one or more fields of science are advised and in fact are insisted upon in work leading to a Certified Statement of Accomplishment in Statistics.

#### OUTSIDE LECTURERS

The Graduate School has made a practice of bringing one or two outside leaders in statistical thinking to Washington annually. In the past, the following eminent authorities have lectured here: R. A. Fisher, John Wishart, Walter A. Shewhart, J. Neyman, Frank Yates, Harold Hotelling, Harold Jeffreys, P. C. Mahalanobis, L. H. C. Tippett, E. J. G. Pitman, and David J. Finney. Some of these lectures are available in print; see the list of publications on the back cover.

#### CERTIFIED STATEMENT OF ACCOMPLISHMENT IN STATISTICS

A Certified Statement of Accomplishment is offered in each of three fields of statistical study—fields representing areas of statistical preparation and application most useful in the public service. The required program in each field is outlined on page 34. The student who holds a bachelor's degree and who completes the basic courses and earns 24 credits in specialized courses listed in any column, with substitutions only as specifically approved, is eligible to receive a Certified Statement of Accomplishment. It certifies that the stu-

# COURSES LEADING TO CERTIFIED STATEMENTS OF ACCOMPLISHMENT IN STATISTICS

(With Concentration in One of the Following Fields of Application)

## THE SOCIAL SCIENCES

College Algebra, Plane Trigonometry and Analytic Geometry  
Principles of Statistical Analysis

## THE NATURAL SCIENCES

### BASIC COURSES—Required of all candidates

College Algebra, Plane Trigonometry and Analytic Geometry  
Principles of Statistical Analysis

## MATHEMATICAL STATISTICS

College Algebra, Plane Trigonometry and Analytic Geometry  
Calculus  
Principles of Statistical Analysis

### SPECIALIZED COURSES

206. Calculus  
400. Introduction to Mathematical Statistics  
448. Population Statistics I—Basic Sources and Methods  
449. Population Statistics II—Intermediate Methods and Applications  
520. Government Statistics  
548. Statistical Analysis of Economic Relationships  
700. Population Statistics III—Advanced Analytical Methods  
727. Planning of Statistical Surveys  
735. Theory of Sample Surveys  
753. Recent Developments in Statistical Concepts

206. Calculus  
400. Introduction to Mathematical Statistics  
507. Statistical Methods in Engineering and Industrial Production  
535. Statistics of Bio-Assay  
704. Interpolation, Approximation, and Mechanical Quadrature  
723. Design and Interpretation of Experiments

400. Introduction to Mathematical Statistics  
500. Advanced Calculus  
708. Linear Algebra  
710. Applications of Linear Regression  
712. Theory of Functions  
723. Design and Interpretation of Experiments  
727. Planning of Statistical Surveys  
735. Theory of Sample Surveys  
741. Theory and Application of the Characteristic Function  
751. Theory of Measure  
752. Advanced Theory of Probability

### ELECTIVE COURSES

435. Sampling in Social and Economic Surveys  
500. Advanced Calculus  
502. Differential Equations  
704. Interpolation, Approximation, and Mechanical Quadrature

709. Theory of Infinite Processes  
712. Theory of Functions  
741. Theory and Application of the Characteristic Function  
752. Advanced Theory of Probability

dent has completed a program of study which, in conjunction with collateral training in a subject-matter field of application, prepares him for effective public service in a particular statistical field.

# INTERNSHIPS IN SAMPLING

## COMMITTEE ON INTERNSHIPS IN SAMPLING

W. EDWARDS DEMING (Chairman)

WILLIAM G. COCHRAN

MORRIS H. HANSEN

STERLING R. NEWELL

S. MCKEE ROSEN

IRVING SIEGEL

FREDERICK F. STEPHAN

ARYNESS JOY WICKENS

In recognition of the need for statisticians with thorough theoretical training and with experience in large-scale statistical projects under competent leadership, and in recognition of the exceptional facilities in Washington for specialized training in this field, the Graduate School has undertaken to present to qualified students the opportunity to pursue their studies under a system of internships. Under this program a limited number of qualified persons have a unique opportunity to combine advanced study with practical experience in sampling.

## PROGRAM

The internships provide opportunity for research work under leading authorities. The program is planned on an individual basis, depending on the experience, training and interests of the candidate. The internships are intended to supplement, not supplant, work offered in universities.

Included among the agencies to which interns may be assigned are:

Bureau of Agricultural Economics

Bureau of the Budget

National Bureau of Standards

Bureau of the Census

Bureau of Labor Statistics

Each intern, and his program, is approved by the agency to which he is assigned.

The internship consists of two integrated parts:

- (1) classroom training, planned to strengthen previous training, in courses at the Graduate School or at other educational institutions in the city;
- (2) work experience in government agencies on large-scale statistical sampling and testing programs. The work in the so-

cial sciences includes assistance in the preparation of questionnaires and sampling plans; development, application, and testing of new theory; writing instructions for use in the field, in the office, and for tabulation; computation of sampling errors; computation of costs; and actual experience in interviewing. Holders of internships in industrial statistics take part in the development of the necessary statistical theory and in experimental design, and have the opportunity of becoming familiar with actual testing practice and the development of new methods.

*Length:* Twelve or eighteen months; the length of time spent in the internship is determined by the training and experience of the applicant. The intern program is planned to conform, so far as practical, with the course program of the Graduate School so that beginning dates may be either September or February.

*Qualification:* Doctorate in mathematical statistics or completion of most of the course requirements, or

Doctorate, or completion of most of the course requirements, in an allied profession such as agriculture, economics, sociology, social psychology, engineering.

#### SELECTION

Each application is reviewed and approved or rejected by the Committee on Internships in Sampling. The Committee helps the intern plan his program and consults with him from time to time concerning his progress. Where the intern program is being developed as a research project, serving as a basis for a doctoral dissertation, the Committee keeps the university informed of progress.

#### STATEMENT OF ACCOMPLISHMENT

Upon satisfactory completion of his program, each intern is awarded a certified statement appropriately descriptive of the nature, extent, and quality of the training and work experience. In the case of pre-doctorate candidates, credit may be transferable under arrangements worked out in advance with the institution in which the intern is a candidate for a degree. In certain cases this work may be used, with the approval and cooperation of the degree-granting institution, as the doctoral thesis or as the basis for it. Where a student is interested in applying credit earned toward a degree or in using intern experience as a basis for a dissertation, arrangements with the institution which is to grant the degree should be completed prior to beginning the intern program.



## Stipends

The internships carry no stipends. The Graduate School makes and offers no living arrangements.

## Fees

The only fees charged are nominal course fees for those courses in which the intern is registered.

## Application

Address the application to the Director, Graduate School, Department of Agriculture, Washington 25, D. C., and include the following information:

- |   |   |
|---|---|
| (1) Name  | (5) Fields of specific interest and                     |
| (2) Date and place of birth                                 | circumstances surrounding                               |
| (3) Transcripts of previous academic work                   | application (i.e., purpose, whether applicant would be- |
| (4) Citations or copies of publications or technical papers | vote full time to internship, etc.)                     |

Applications may be submitted at any time but should be submitted well in advance of the beginning of the fall and spring semesters, in September and February, to insure adequate arrangement of work schedules and course programs.

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*Course Numbers and Symbols*—Below 100, non-credit; 100–399, undergraduate; 400–699, graduate and advanced undergraduate (senior); above 699, graduate. Bracketed numbers, not given this year.

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## MATHEMATICS

### 1. Review of Freshman Mathematics

Summer, non-credit

SIDNEY KAPLAN

A review course on the level of freshman mathematics. Algebra, trigonometry, analytic geometry. A brief introduction to the methods of the differential calculus. Emphasis on applications to statistical problems. *Prerequisite*: One year of college mathematics.

### 2. Review of Calculus

Fall, non-credit. Repeated in Summer

H. BURKE HORTON

Variables, functions, limits, divided differences, derivatives, application of derivatives to geometry, engineering curve fitting and analysis. Transcendental



functions, polar equations, differentials, mean value theorem, techniques of integration and engineering application. Series and expansion of functions. *Prerequisite:* Calculus.

## 102. Algebra

Fall, 3 credits. Repeated in Summer

JOSEPH S. RHODES

Fundamental rules of algebra; exponents; logarithms; manipulations with proportions; identities and conditions; solution of equations; binomial theorem; numerical approximations. Uses of symbolic operators. Determinants; solution of equations by the reciprocal matrix. Theory of equations; progression; series. Permutations and combinations. Graphical methods. Emphasis on applications to statistics and the physical sciences. *Prerequisite:* High school algebra and plane and solid geometry.

## 104. Trigonometry

Spring, 2 credits

JOSEPH S. RHODES

Basic definitions and uses of trigonometric functions; logarithmic solutions; radian measure; fundamental identities; oblique triangles; polar coordinates, inverse trigonometric functions; complex numbers and De Moivre's theorem; graphs of the functions and the inverse functions; introduction to spherical trigonometry. *Prerequisite:* College algebra.

## 105. Analytic Geometry

Fall, 4 credits. Repeated in Spring

To be announced

Planned for students majoring in engineering. Coordinates, locus problems, the straight line and circle, graphs, transformation of coordinates, conic sections, parametric equations, solid analytic geometry, curve fitting. *Prerequisite:* College algebra and trigonometry.

## 106. Analytic Geometry

Spring, 2 credits

JOSEPH S. RHODES

Fundamental concepts and formulas; line, circle, parabola, ellipse, hyperbola; transformation of coordinates; polar coordinates; parametric equations; the second and higher degree equation in rectangular coordinates; graphic solution of equations; introduction to solid analytic geometry. *Prerequisite:* College algebra and trigonometry.

## 206. Calculus

Year, 4 credits each semester

THOMAS N. E. GREVILLE  
IRVIN POLLIN

*First half.* Variables, functions, limits, continuity, divided differences, derivatives. Application of the derivative to geometry, physics, curve fitting, and analysis. Mean value theorem. The anti-derivative. Riemann integration.

*Second half.* Standard integral forms. Partial and total derivatives. Constrained maxima and minima in two variables; Lagrange multipliers. Interpolation. Taylor's series with one, two, and three variables. Propagation of errors. Series. Multiple integrals. Line integrals. Approximate integration; the Euler-Maclaurin formula for integration and summation. History and application stressed. *Prerequisite:* Algebra, trigonometry and analytic geometry.

## [307.] Unified Mathematics (1951-52 and every third year)

MURRAY A. GEISLER

## 500. Advanced Calculus

Year, 2 credits each semester (every third year)

JOSEPH H. KUSNER

Review of fundamental theory of the calculus, Taylor's series and related subjects. Plane curves, envelopes, order of contact. Differentiation and integration of integrals; line, surface and volume integrals. Infinite and improper integrals. Some calculus of variations. Asymptotic series and approximations to definite integrals in functions with several variables. Function scales and relations between derivatives. Reduction of curves to linear relations. Surfaces, tangent planes, and normals. Some study in the complex variable. *Prerequisite:* Calculus.

## [502.] Differential Equations (1952-53 and every third year)

RICHARD K. COOK

## [704.] Interpolation, Approximation, and Mechanical Quadrature (1951-52 and every third year)

THOMAS N. E. GREVILLE

## [715.] Applications in Engineering Mathematics (1951-52 and every third year)

RICHARD K. COOK

## 610. Introduction to Nonlinear Mechanics

Year, 2 credits each semester (alternate years)

OTIS E. LANCASTER

Presentation of nonlinear problems in vibrations, electronic circuits, servo-mechanism control, shock waves. Analytical methods: van der Pol, Poincaré, Kryloff and Bogoliuboff. Linear and nonlinear conservative systems, limit cycles, indices of Poincaré. Applications: nonlinear resonance and associated phenomena, relaxation oscillations, stability, influence of periodic disturbances. *Prerequisite:* Advanced calculus and differential equations.

## 706. Analytical Mechanics

Year, 2 credits each semester (every third year)

RICHARD K. COOK

The elements of vector analysis. The fundamental principles of statics, kinematics, and dynamics. Lagrange's and Hamilton's generalized equations. Central forces; vibrations; wave motion; gyroscope; top. Potential theory. *Prerequisite:* Calculus, college physics, and elementary statics and dynamics.

## [709.] Theory of Infinite Processes (1952-53 and every third year)

JOSEPH H. KUSNER

## [712.] Theory of Functions (1951-52 and every third year)

JOSEPH H. KUSNER

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Some of the mathematical courses offered by the Educational Committee at the National Bureau of Standards may be of interest to prospective students. Persons outside the National Bureau of Standards wishing to enroll may secure additional information from the Registrar, National Bureau of Standards.

## STATISTICS

*Elementary Courses***110. Graphic Methods of Presenting Statistics**

Spring, 2 credits

R. G. HAINSWORTH

Analysis of statistical data to determine what form is best for graphic presentation. Application of data to the many types of illustrations in several forms of the various classes. Rough pencil layout examples of time series charts, frequency diagrams, graphic correlation charts, pictorial symbol charts, cartograms and other illustrative examples will be prepared in class. Comparability and evaluation of individual charts and maps in a series will be analyzed. *Prerequisite:* An introductory course in statistics, Elements of Statistical Drafting, or experience approved by the instructor.

**126. Introductory Statistics**

Year, 2 credits each semester. Repeated in Spring

HARALD C. LARSEN

C. M. PURVES

OTTO RAUCHSCHWALBE

The collection of economic and census data. The presentation of data in tables and charts. Different kinds of averages. Dispersion. Introduction to index numbers. Relations between two or more variables. Introduction to correlation theory, regression, and interpretation of samples. Practice in calculations. *Prerequisite:* High school algebra and geometry.

**127. Principles of Statistical Analysis**

Year, 3 credits each semester

B. RALPH STAUBER

The purpose of the course is to lay a thorough foundation of the basic concepts and principles of statistical analysis as a method of scientific investigation.

Specifically, the course includes statistical terminology; elementary probability; the binomial, Poisson, and normal distributions; statistical tests of significance; simple and multiple correlation; some theory of determinants with applications to correlation and the inverse matrix; introduction to analysis of variance; introduction to sampling; elementary principles of design and analysis of surveys and experiments; use of statistical tables such as Fisher, Yates, and others. *Prerequisite:* College algebra, plane trigonometry, and analytic geometry; an elementary course in statistics is helpful but not absolutely essential.

**340. Introduction to Experimental Statistics**

Year, 2 credits each semester

WALTER A. HENDRICKS

A non-mathematical course in the analysis and interpretation of data from agricultural and biological experiments. Elementary probability relationships; binomial, Poisson, and normal frequency distributions; the concept of sampling error; tests of significance of differences between averages; the chi-square test as applied to differences between observed and expected frequencies; regression and correlation; and elementary discussions of analysis of variance and covariance. Numerical examples. Text: Snedecor, Statistical Methods. *Prerequisite:* High school algebra and geometry; college training in one or more of the agricultural or biological sciences; familiarity with ordinary methods of tabulating experimental data, computation of averages and the preparation of graphs.

**318. Machine Tabulation**

Fall, 2 credits. Repeated in Spring

MILTON KAUFMAN

The punch-card method. Functions of the principal types of tabulating machines. Operations of the machines are demonstrated. The instruction covers basic wiring of all types of commercial tabulating equipment. *Prerequisite:* General knowledge of tabulating equipment.

**319. Advanced Application of Tabulating Equipment**

Spring, 2 credits

MILTON KAUFMAN

The solution of advanced problems in the application of card-tabulating equipment, including the wiring of principal machines involved. *Prerequisite:* A course in machine tabulation and knowledge of the basic wiring of tabulating equipment.

*Advanced Courses***400. Introduction to Mathematical Statistics**

Year, 3 credits each semester

BENJAMIN J. TEPPING

A foundation course designed to give the student a broad introduction to modern mathematical statistics, after which he may specialize in application and do further work in mathematical statistics either for an advanced degree or a certified statement of accomplishment. General properties of sampling-distributions, with special studies of the binomial, hypergeometric, Poisson, multinomial, and normal distributions. Joint distributions of several variables. Moment generating functions. Distributions of chi-square, Student's *t*, Fisher's *z*, Snedecor's *F*, and the sample range. Distribution-free methods. Tests of statistical hypotheses. Estimation; bias, consistency, efficiency. Discriminant functions. Design of samples and experiments. *Prerequisite:* Calculus and Principles of Statistical Analysis or equivalent.

**735. Theory of Sample Surveys**

Year, 2 credits each semester

MORRIS H. HANSEN, WILLIAM N. HURWITZ  
and JOSEPH STEINBERG

History of sampling in social surveys. The use of statistical control in improving the quality and efficiency of the estimates. Calculation of sampling errors. Random, stratified random, purposive, double and systematic sampling. Cost function, choice of sampling unit; size and type of sample necessary to attain a stated degree of precision, and the distinction between precision and accuracy. The theory of probability is developed as necessary. The contributions of Fisher, Neyman, Yates, Cochran, and others are studied. *Prerequisite:* Principles of Statistical Analysis and Calculus.

**[741.] Theory and Application of the Characteristic Function (1952-53 and every third year)**

WALTER JACOBS

**[708.] Linear Algebra (1951-52 and alternate years)**

JOSEPH F. DALY

**[710.] Applications of Linear Regression (1951-52 and every third year)**

JOSEPH F. DALY

**[748.] Introduction to Mathematical Analysis (1952-53 and every third year)**

MURRAY A. GEISLER

**[751.] Theory of Measure (1952-53 and every third year)**

MURRAY A. GEISLER



**752. Advanced Theory of Probability**

Year, 3 credits each semester (every third year)

MURRAY A. GEISLER

Permutations, arrangements, and combinations; conditional probability; compound probability; repeated trials; Bayes' formula; simple Marloff chains; problem of runs; partial difference equations; Bernilli's theorem; games of chance; law of large numbers; Markoff and Khintchine theorems; probabilities in continuum; Stieltjes integral; fundamental limit theorems; probability and statistical distributions; limit theorems for sums of independent vectors; method of moments and its applications; Tschebycheff's inequalities. *Prerequisite:* Calculus.

*Applied Courses***560. Theory of Electronic Digital Computing Machines**

Fall, 2 credits

EDWARD W. CANNON

Mathematical requirements for electronic digital computers. Alternative methods of sequencing automatic computers—instruction codes. Electronic computer systems and components—internal memory, control, arithmetic unit, input-output devices. Performance characteristics of electronic computers; analysis of errors. Preparation of problems for machine solution. *Prerequisite:* A bachelor's degree with major in engineering, mathematics, statistics, or physics and Principles of Statistical Analysis or equivalent.

**561. Advanced Theory of Electronic Digital Computing Machines**

Spring, 2 credits

EDWARD W. CANNON and SPECIALISTS

Analysis of design features of electronic digital computing machines, including treatment of control systems, arithmetic organs and memory devices. Advanced programming methods and exercises in coding problems for solution on the machines. *Prerequisite:* Theory of Electronic Digital Computing Machines.

**[410.] Agricultural Estimating Procedures (1951–52 and every third year)**

WALTER A. HENDRICKS

**[545.] Advanced Agricultural Estimating Procedures (1952–53 and every third year)**

WALTER A. HENDRICKS

**480. Statistical Methods and Experimental Design**

Fall, 12 credits. Repeated in Spring

JAMES G. OSBORNE

Application of statistical methods to research work in the Forest Service stressing the logic of experimentation and the techniques of design, analysis, and interpretation of experiments or surveys. Emphasis is placed on: testing hypotheses in forest research; distribution of sample statistics; tests of significance.

Registration limited to qualified research personnel of the Forest Service.

**723. Design and Interpretation of Experiments**

Year, 2 credits each semester

W. J. YODEN

An introductory course concerned with setting forth (a) the characteristics of a good experiment, (b) experimental designs and the associated statistical techniques for analyzing the data, and (c) methods for improving the precision of



experiments. The topics will be illustrated by examples. *Prerequisite:* A degree in one of the sciences, Principles of Statistical Analysis or equivalent, or consent of the instructor.

### 535. Statistics of Bio-Assay

Fall, 2 credits (alternate years) JEROME CORNFELD and JACOB E. LIEBERMAN

Biological experimentation including experimentation on sensitization and toxicity; design and analysis of experiments to determine potency, standard error and other parameters of pharmaceuticals compared with standards; dosage-response and dosage-mortality relationships. *Prerequisite:* Elementary statistics, a degree in one of the sciences or equivalent, or permission of the instructor.

### 507. Statistical Methods in Engineering and Industrial Production

Year, 2 credits each semester (alternate years) W. R. PABST

First half: Use of statistical methods in analyzing engineering problems, development of sampling plans and tables, acceptance sampling, use of quality control charts.

Second half: Sampling methods for engineering purposes, design of engineering experiments, intensified and sensitivity testing, interpretation of test data, application to specifications. *Prerequisite:* Elementary statistics, a degree in science or engineering, or permission of the instructor.

### 532. Survey of Linear Programing

Year, 2 credits each semester (alternate years) GEORGE B. DANTZIG

Review of major papers in the field. Topics: postulates, construction of models, concepts of efficient points, objective functions, optimum under limited means, computational techniques, relationship to the theory of games, the dual price-system, triangular systems. Problems connected with scheduling, transportation, nutrition, and production. *Prerequisite:* Calculus and knowledge of some field in which linear programing could be developed, or advanced mathematics or mathematical statistics.

### [530.] Economic Models (1951-52 and alternate year)

EMIL SCHELL

### [548.] Statistical Analysis of Economic Relationships (1951-52 and alternate years)

RICHARD O. BEEN

### 727. The Planning of Statistical Surveys

Year, 2 credits each semester A. J. JAFFE and W. PARKER MAULDIN

Administrative uses of statistical data. Special difficulties in the collection of information on employment, unemployment, payrolls, costs, prices, consumption, opinions and attitudes. Statement of purpose of a survey; definition of the universe, with attention to special difficulties. Interviewing; construction of questionnaires. Complete and partial investigations; comparisons of biases in different kinds of partial investigations. Advantages and disadvantages of sampling. Computation of costs. Tabulation plans. Presentation of results for research purposes and for administrative use. *Prerequisite:* Principles of Statistical Analysis, statistical experience and academic work and practice in sociology or economics.

**435. Sampling in Social and Economic Surveys**

Fall, 3 credits

HAROLD NISSELSON

Non-mathematical survey of sampling theory and practice. Development of the basic ideas of statistical sampling, with applications in social and economic surveys. Unrestricted random, stratified, systematic, area and cluster sampling, and subsampling. Sample designs used in the United States and in foreign countries are discussed with respect to considerations of statistical efficiency, cost functions, and the administrative limitations imposed on the design. *Prerequisite:* A course in elementary statistics.

**01. Sampling**

January 29 to July 20, 1951, non-credit

SELECTED LECTURERS

Designed primarily for foreign students, and given at the suggestion of the Inter-American Statistical Institute.

Review of elementary statistical theory; errors in surveys; steps in planning a survey; construction of questionnaires; choice and development of sampling units; variances in single and multiple stages of sampling; costs; ratio-estimates; sampling of human populations, farms, commerce; effects of departures from theory; tabulation and control.

**021. Sampling and Statistical Inference**

Year, non-credit

JOHN B. BODDIE and W. EDWARDS DEMING

Annually the Department of Mathematics and Statistics conducts a series of six to eight lectures and discussions on sampling and statistical inference. These meetings, addressed by leading mathematical statisticians, are held primarily for advanced students in the Graduate School and others who are working in this field.

No fee is charged; registration, however, is required. Applications for new admissions to the seminar should be sent in writing to the Graduate School, with a statement regarding the applicant's education and experience. Notices regarding meetings are sent to those whose names are on the list.

**520. Government Statistics**

Year, 2 credits each semester (alternate years)

MORRIS B. ULLMAN

Designed to give acquaintance with the wealth of data available from Federal agencies; methods used by different agencies for the collection of data; comparisons of biases, definitions, and basic concepts; different methods of presentation. The first semester concentrates on limitations inherent in data, the second on sources and uses of data. *Prerequisite:* An elementary course in statistics.

**[515.] Publication of Statistical Reports (1951-52 and alternate years)**

MORRIS B. ULLMAN and BRUCE L. JENKINSON

**[753.] Recent Developments of Statistical Concepts (1952-53 and every fourth year)**

MORRIS B. ULLMAN and SPECIAL LECTURERS

**448. Population Statistics I: Basic Sources and Methods\***  
(See p. 97)**449. Population Statistics II: Intermediate Methods and Applications\***  
(See p. 97)

\* Presented jointly with the Department of Social Sciences.

# Schedule of Classes

## Summer Session 1951

U.S. Department of Agriculture

## Graduate School



Undergraduate and  
graduate studies

June 4 - August 10

## REGISTRATION

### Time

May 28-May 29, 9-6:30

May 31-June 1, 9-6:30

June 2, 9-4

### Place

Room 1031, South Building  
U.S. Department of Agriculture  
14th St. and Independence Ave.  
Washington, D.C.

# Class Schedule and Supplement

## *to 1950-51 Bulletin*

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**Classes begin** during week of June 4, end August 10. All classes meet in the evening, unless otherwise indicated.

**Complete details**, including rules, regulations, and course descriptions, are given in the 1950-51 Bulletin, a copy of which may be obtained from the Graduate School office. Counselors and training officers of your agency have a copy which you may examine.

**Counseling** on courses and programs of study, to assist students in planning their work, is available from members of the school staff.

**Registration**: See schedule on front cover. No one will be registered for credit after June 8, except with permission of instructor and Registrar. Registration closes in a course when the maximum for that class is reached.

**Late registration**: After June 2, a \$2.00 per course late registration fee will be charged.

**Refund** of fees, less \$3.00 registration fee, may be granted in case of withdrawal before 6:20 p.m., June 11. After this date no refunds will be approved unless the student is compelled to leave Washington because of official governmental action.

**Business office**, Room 1031, South Agriculture Building. Hours: 9:00 a.m. to 6:20 p.m., Monday through Friday.

**Textbooks**: Sold in Room 1041, South Agriculture Building

May 28-June 1 (except May 30)	1:00-6:30
June 2	9:00-4:00
June 4-8	1:00-6:30
June 11-15	4:30-6:20
After June 15	4:30-5:30

**Additional courses**: The School welcomes suggestions for courses not included in this Schedule and will make every effort to organize courses for which there is sufficient interest.

### Fall Semester

Registration begins September 15  
Classes begin week of September 24

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**Explanation**: Basic information about each course is given in the following order: course number, title, semester hours of credit, instructor, day and hour of class meeting, fee, and page of 1950-51 Bulletin on which description may be found. New courses and new instructors are indicated by an asterisk. The first half and the second half of a course are indicated by A and B respectively.

**Room Schedules** will be given at the time of registration.



## ACCOUNTING

- 6-352A. **Principles of Accounting**—First Half (3) Marshall M-W 6-9 \$24 p. 77  
6-352B.—**Principles of Accounting**—Second Half (3) Smith Tu-Th 6-9 \$24 p. 78

## ADMINISTRATION AND ADMINISTRATIVE PROCEDURES

- 6-341. **American National Government** (2) Small W 6:30-9:30 \$16 p. 67  
6-344. **Introduction to Public Administration** (3) Brown Tu-Th 6:15-8:30 \$24 p. 67  
6-444. **Position Classification** (2) Laxton, Findlay Tu-Th 6-8 (seven weeks) \$18 p. 73  
4-108. **Administrative Procedure** (2) Hickey M 6-9 \$16 p. 47  
4-101. **Business Mathematics** (2) L. Rhodes Th 6-9 \$16 p. 47  
4-110. **Federal Auditing Procedure** (2) Selinsky W 6-9 \$16 p. 48  
4-112. **Federal Accounting Procedure** (3) Tierney M-W 6-8:15 \$24 p. 48  
4-114. **Federal Personnel Procedure** (2) Mohagen M 6-9 \$16 p. 50  
4-120. **Government Letter Writing** (2) Samson Th 6-9 \$16 p. 51  
4-201. **Supervision\*** (2) Sharar M 6-9 \$16

A course for persons who have or expect to have first-line supervisory responsibilities. Particular emphasis will be placed upon the need for understanding human behavior and attitudes as they manifest themselves in group efforts. The dynamic setting in which supervisory responsibilities are discharged, its importance to management, the individual qualities and specific techniques employed by supervisors to improve work methods will be considered, and a program of self-development and self-evaluation in the art of supervision suggested.

## ARTS

- 8-70. **Popular Photography** (non-credit) Matthews W 6-9 \$16 p. 114  
8-321. **Pencil Sketching and Water Color Painting** (2) Lyon M-Th 6-9 \$24 p. 111

## BIOLOGICAL SCIENCES

- 1-213. **Identification of Local Plants** (2) Mitchell\* M 6-9 \$16 p. 19 (Field trips as arranged)  
1-214. **Birds of the Washington Area** (2) Robbins W 6-9 \$16 p. 19 (Saturday field trips as arranged)

## ENGLISH AND SPEECH

- 2-118. **Practical English Usage** (2) Mangold Tu 6-9 \$16 p. 23  
2-119. **Vocabulary Building** (2) Murphy Th 6-9 \$16 p. 23  
2-222A. **English Composition** (3) Miller Tu-Th 6-8:15 \$24 p. 22  
2-222B. **English Composition** (3) Harmon Tu-Th 6-8:15 \$24 p. 22  
2-223. **Descriptive English Grammar** (2) Harman Th 6-9 \$16 p. 23  
2-235. **Fiction Writing** (2) Christie W 6:30-9:30 \$16 p. 24  
2-228. **Fundamentals of Speech** (2) Roser M 6-9 \$16 and \$1.50 laboratory fee p. 24  
2-232. **Voice and Remedial Speech** (2) Emery Tu 6-9 \$16 and \$1.50 laboratory fee p. 25



## FOREIGN LANGUAGES

- 2-253A. Elementary French (3) DeMarne Tu-Th 6-8:15 \$24 p. 29
- 2-253B. Elementary French (3) Seilliere Tu-Th 6-8:15 \$24 p. 29
- 2-40. Everyday French (non-credit) Arnould W 6-9 \$16
- 2-259A. Elementary German (3) Frenkel\* M-Th 6-8:15 \$24 p. 30
- 2-259B. Elementary German (3) Mr. Ponti M-Th 6-8:15 \$24 p. 30
- 2-41. Everyday German\* (non-credit) Mrs. Ponti\* M-Th 6-7:30 \$16
- 2-295A. Elementary Russian (3) Tarakus Tu-Th 6-8:15 \$24 p. 30
- 2-295B. Elementary Russian (3) Korenev-Rockwell M-W 6-8:15 \$24 p. 30
- 2-45. Review of Elementary Russian (non-credit) Saharov W 6-9 \$16 p. 30
- 2-300A. Elementary Spanish (3) G. Supervia M-W 6-8:15 \$24 p. 31
- 2-300B. Elementary Spanish (3) Johnston M-W 6-8:15 \$24 p. 31
- 2-47. Everyday Spanish (non-credit) Garcia-Tunon W 6-9 \$16 p. 31

## MATHEMATICS AND STATISTICS

- 3-1. Review of Freshman Mathematics (non-credit) Kaplan Tu-Th 6:15-8:30 \$24 p. 37
- 3-2. Review of Calculus (non-credit) Horton Tu-Th 6-8:15 \$24 p. 37
- 3-102. Algebra (3) J. Rhodes M-W 6-8:15 \$24 p. 38
- 3-318. Machine Tabulation (2) Kaufman W 6-9 \$16 p. 40
- 3-126A. Introductory Statistics (2) Larsen Tu 6-9 \$16 p. 40
- 3-126B. Introductory Statistics (2) Rauchschiwalbe W 6:15-9:15 \$16 p. 40

## PHYSICAL SCIENCES

- 5-162. Weather Survey (2) Haggard Tu 6-9 \$16 p. 59

## SECRETARIAL STUDIES

- 4-89. Review of Gregg Shorthand (non-credit) Flinchum\* M-W 6-8:15 \$24 p. 53
- 4-129. Beginning Gregg Shorthand I (3) Wilkey M-W-F 6-7:30 \$24 p. 53
- 4-130. Beginning Gregg Shorthand II (3) Hobbs\* M-W-F 6-7:30 \$24 p. 54
- 4-225. Gregg Shorthand, 60-80 Words (3) Bell\* M-W-F 6-7:30 \$24 p. 54
- 4-226. Gregg Shorthand, 80-100 Words (3) Rowland M-W-F 6-7:30 \$24 p. 54
- 4-325. Secretarial Practices (2) Groff\* W 6-9 \$16

## SOCIAL SCIENCES

- 7-110. Introductory Survey of Economics (2) Burroughs W 6-9 \$16 p. 84
- 7-105. Introduction to Human Relations (2) Longmore M 6-9 \$16 p. 94
- 7-428. The Struggle for Peace—Current World Problems (2) Berger W 6-9 \$18 p. 100

# Department of Office Techniques and Operations

## DEPARTMENTAL COMMITTEE

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## CLERICAL-ADMINISTRATIVE PROCEDURES

The courses described under Clerical-Administrative Procedures are closely related to those offered in the Department of Public Administration and are an integral part of the program leading to the Certified Statement of Accomplishment in Administrative Procedures. They are practical, how-to-do-it, courses chiefly of interest to persons in grade GS-7 positions, or below, who are either working with these procedures, or who hope to train themselves for such positions, or positions requiring some familiarity with more than one of these procedural subjects (e.g., administrative assistants and head clerks). High school graduation is a basic requirement for admission to these courses; exception will be made only on the basis of proven equivalent experience.

## CERTIFIED STATEMENT OF ACCOMPLISHMENT IN ADMINISTRATIVE PROCEDURES

The program leading to a Certified Statement of Accomplishment in Administrative Procedures should be of special interest to:

1. Persons already employed in administrative work of the procedural type, emphasizing techniques and skills.
2. Employees who aspire to enter administrative work but who, because of lack of college education, find their opportunities in that field greatly limited except at the procedural level. This program of courses is useful for persons with good native ability but limited educational background, because it prepares them for a level of work most likely to be open to them. After they have succeeded in getting into administrative work, perhaps even at the clerical-administrative level, they can then combine their work-experience and study-experience to mutual advantage as progress is made toward greater responsibility. This approach is believed to be better for such persons than the common practice of attempting to circumvent the usual educational requirements by shortcut concentration on advanced and specialized courses, which are

actually preparatory for responsible positions only insofar as they *supplement* broader educational background.

3. Employees who wish to prepare to become administrative assistants or to head units concerned with administrative procedures.

### *Approach*

Emphasis on techniques, procedures, methods, but with an attempt to understand and use these means in terms of administrative ends or objectives.

### *Objectives*

Ultimately, for responsible conduct of important "housekeeping" operations of specialized character, direction of small units, performance of most difficult and responsible tasks in the procedural aspects of administration, and the settlement of questions of intermediate importance arising out of current or contemplated operations and not covered by existing regulations or decisions.

Immediately, for effective service in some administrative procedure at the clerical or semi-clerical level, as a means of entrance into the line of promotion leading to the responsibilities named above. (Students already at this level may arrange programs in conformity with their needs.)

### *Requirements*

1. High school diploma or equivalent.
2. Sixteen semester hours of credit selected from the following Graduate School courses:
  - a. A minimum of eight credits must be selected from Advanced courses in Clerical-Administrative Procedures, or from courses offered in the Department of Public Administration (excluding all accounting courses except Federal Government Accounting) or a combination of these.
  - b. A course in American National Government.
  - c. The remaining credits may be selected from courses, not included above, in the Department of Office Techniques and Operations, excluding all shorthand courses.
  - d. A course in elementary statistics (not exceeding three credits) may be included. It is not required. If it is included, three credits may be deducted from *c* above.

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*Course Numbers and Symbols*—Below 100, non-credit; 100–399, undergraduate; 400–699, graduate and advanced undergraduate (senior); above 699, graduate. Bracketed numbers, not given this year.

## CLERICAL-ADMINISTRATIVE PROCEDURES

**108. Administrative Procedure**

Fall, 2 credits. Repeated in Spring and Summer

THOMAS J. HICKEY  
EARL D. SHARAR

Intended for persons who wish to become supervisors or administrative assistants or who are now serving in such capacity in a small organizational unit. Deals with the "HOW" aspects of the day to day assignments for which these persons ordinarily are responsible, such as preparation of budget data for small organizational units; preparation of recommendations on personnel actions in a typical organization; the maintenance of office records; orientation and assignment of new employees; essential requirements for good supervision.

The second part of this course deals with the introduction to administrative planning, administrative procedures and management generally at the lowest organization level, including work reporting and work measurements, work processes and work control reports; relation of these studies to the budgetary and personnel needs of the unit; and the theory of staff versus operating jurisdiction over administrative planning.

**208. Advanced Administrative Procedure**

Fall, 2 credits. Repeated in Spring

M. HARVEY SHERMAN

Intended for persons who are now assigned to administrative assistant and supervisory positions. Deals with (1) the conduct of administrative and procedural surveys and audits directed toward the development of factual data for management purposes; the analysis of these data, the preparation of reports and recommendations thereon; (2) the putting into effect of the approved recommendations through the actual drafting of procedural instructions and the designing and standardization of forms; (3) the installation of approved procedures and the establishment of executive controls to insure compliance with approved instructions; (4) the modern and tested techniques and methods ordinarily used in developing factual data and graphic presentations regarding flow of work, organization structure, work assignments, authority, work duplications, delays and bottlenecks; (5) report writing; (6) the value of illustrated presentations of work processes in eliminating duplication of work, in simplifying operations and in cutting out unnecessary steps; (7) the value of and the need for specific written manuals of instructions as tools of management; and (8) the relation of these instructions to those taught in the other Office Techniques and Operations Courses. *Prerequisite:* Completion of one of the following courses in Office Techniques and Operations: 108, 110, 112, 113, 114, 115, 116, 117.

**101. Business Mathematics**

Fall, 2 credits. Repeated in Spring and Summer

RALPH R. BOTTS  
LEONARD H. RHODES

Designed for clerical workers who are called upon to apply fundamentals of arithmetic to their jobs. Emphasis will be placed on review of business arithmetic including fractions, ratios, proportion, percentages, common divisors and multiples, progressions and elementary graphs and statistics. Special applications will be made to business problems such as simple interest; simple, bank, cash and trade discount; profit and loss; sales turnover; equation of partial payments and accounts; commuting debts; compound interest; compound discount; and annuities. Use of calculating machine will be explained.



## 110. Federal Auditing Procedure

Fall, 2 credits. Repeated in Spring and Summer

To be announced

This intensive one-semester course is intended for those having no previous knowledge of the subject and is designed to furnish fundamental training for employees now in lower grades as clerks, typists, machine operators, etc., who intend to take the course on Advanced Federal Auditing Procedure or who have opportunities of eventually becoming auditors by serving apprenticeships. It covers explanations of, discussions on and practice work with the two most common types of Government vouchers; deals with, to a limited extent, certain related documents and procedures and should prepare students for higher grades and better-paying positions.

Embraces general and basic principles; definitions of terms, description and use of standard forms involved, authorizations and allocations; general procedure in auditing standard form 1034 vouchers; suspensions and disallowances, General Accounting Office exceptions and replies; purchase order procedure and its relation to auditing; tax exemption procedure and its effect upon auditing; general procedure in auditing standard form 1012 vouchers; authority for travel, emergency travel per diem allowances, method of computation; methods of travel, duty status and leave, application of statutes, regulations and Decisions of the Comptroller General; exigency statements, special correspondence; and practice audit work on standard form 1034 "purchase" vouchers and standard form 1012 "reimbursement" vouchers.

## 210. Advanced Federal Auditing Procedure

Spring, 2 credits

EMMETT B. COLLINS

Includes explanations of and discussion on Federal auditing policy and practice along advanced lines. Covers the relationship of auditing to general fiscal control; administrative examination of fiscal documents; application of legislation and regulations; use of Comptroller General Decisions; relation of Comptroller General's Decisions to particular cases; normal methods of handling suspensions, disallowances, certifications, etc.; unusual problems in the audit of standard form 1034 vouchers and 1012 vouchers; relationship of procurement to auditing and the policies followed in the use of purchase orders; authority for travel and policies relating thereto; per diem allowances and computations, and policies respecting rates; transportation of property and personnel, use of transportation requests and bills of lading; audit of transportation vouchers; audit of payrolls and application of payroll procedures; General Accounting Office exceptions and preparation of replies; claims, adjustments and direct settlements. This advanced course in Federal Auditing Procedure is designed to assist auditors to prepare themselves for more responsible and more remunerative positions. *Prerequisite:* Federal Auditing Procedure or equivalent experience.

## 112. Federal Accounting Procedure

Fall, 3 credits. Repeated in Spring and Summer

JOHN L. TIERNEY

Designed particularly to train accounting clerks through instruction of employees now working in lower grades and to assist accounting clerks in present and prospective positions. It embraces explanation of, discussion on, and practice work with the basic ledgers (allotment ledger, objective classification ledger, and general ledger) maintained in connection with funds made available to Federal agencies. Appropriation, apportionment, allotment, disbursement, collection, and reporting processes will be discussed and the relationship between administrative accounts and accounts kept by the Treasury Department and the General Accounting Office explained.



## 116. Federal Budgetary Procedure

Fall, 2 credits. Repeated in Spring

JESSE B. McWHORTER  
ERNEST L. STRUTTMANN

This course is designed to assist employees either in budget work or preparatory to taking budget work, up to and including Grade GS-9. It deals with budgetary procedures, including the preparation of estimates, justifications, tabular statements, graphs, etc., and, in connection with budget execution, outlines methods in making allotments, preparation of apportionment and obligation reports, and other methods used in the formulation and execution of the Federal budget.

## 122. Federal Payroll Procedure

Spring, 2 credits (alternate years)

LOUISE M. KRUEGER

This course deals with the basic principles and procedures relative to paying compensation to Federal employees, including pay computation, deductions, pay roll preparation with special emphasis on the "Simplified Payrolling Procedure" prescribed by the General Accounting Office, scheduling, processing the voucher, pay roll adjustments, and Decisions of the Comptroller General relating to pay. In addition the course will cover the necessary accounting work involved in individual earnings, retirement, tax, bonds, and other deductions, and reconciliation of records within the pay roll unit and with the general accounting records. It is designed to assist present and future pay roll clerks in understanding the current Federal Employees Pay Act and in operating under the "Simplified Payrolling Procedure."

## 115. Federal Purchasing Procedure

Fall, 2 credits

JAMES SCAMMAHORN

Elementary principles and ethics of Federal purchasing in general and its relation to operating programs; historical background; organization for purchasing; purchasing and contracting authority; basic practices and procedures with legal and administrative background; use and preparation of requisition, purchase order, bid, bill of lading; voucher and other procurement forms; sources of supply such as Federal Supply Schedules, Government warehouses, prison industries, blind-made products; surplus disposal agencies, commercial market, and how to use such sources; open market and bid purchases; leasing of space; preparation, inviting and award of bids, including fundamentals of writing specifications; advertisements in publications; formal contracts, including source of supply contracts, and bid and performance bonds; inspection of deliveries for compliance with specifications; trade-in of equipment; procurement of special items.

## 113. Federal Property Procedure

Fall, 2 credits

PERCY M. LUM

An elementary course covering principles and procedures in property utilization, accountability, and disposal of Federal property. It is designed to furnish persons currently employed in this field an opportunity to learn the mechanics of their day-to-day jobs through a short intensive study of the prescribed policies and regulations and accepted practices. The chief objectives of the course are to acquaint the student with the essential operations in connection with: property inventorying; accountability records and controls; borrowing and loaning; lost, damaged, or destroyed property; development and application of equipment utilization and replacement standards; transfers and disposals; sales; donations; destruction or abandonment; determination of requirements; management through inventory controls; nomenclature; and statistical reporting of motor vehicle operation.

## **114. Federal Personnel Procedure**

Fall, 2 credits. Repeated in Spring and Summer

VERNA C. MOHAGEN

Deals with the elementary principles and procedures of Federal personnel administration, including a study of the Federal personnel structure and organization, history and progress of the merit system, rules and regulations of the Civil Service Commission, and other basic procedural sources; use of personnel forms, records and files systems; Civil Service examinations and recruitment; appointments; transfers; promotions; separations, terminations and reductions in force; suspensions and disciplinary actions; retirement; efficiency ratings; leave and hours of duty; personnel reports, applications of Decisions of the Comptroller General, administrative policy statements, and administrative orders.

## **214. Advanced Federal Personnel Procedure**

Fall, 2 credits. Repeated in Spring

EUGENE J. PETERSON

Similar to Federal Personnel Procedure but more thorough in its treatment of the subject. Deals with advanced principles and techniques in Federal personnel procedures and their relation to operating programs, including a study of the principles of the Civil Service Act, Rules and Regulations, and their application to day-to-day problems in a Federal personnel office; recruiting sources for Civil Service examinations and appointments; study of promotion-from-within procedures; reduction-in-force procedures, and their application to specific operating situations; policies and their procedures for the handling of veterans' problems including placement of returning veterans; study of procedures for systematic retirement of employees reaching annuity age; procedures for investigation and enforcement of discipline; periodic reports and their use for operating purposes; procedure and policy statements in the general field of personnel administration; procedural source materials such as the Civil Service Commission, Federal Personnel Manual, Decisions of the Comptroller General, Executive Orders, etc., and applying them to detailed operating procedures; relationship of the personnel office to budget, accounting, payrolling, and other staff functions. *Prerequisite:* Federal Personnel Procedure or equivalent practical experience in a Federal personnel office at Grade GS-4 or above.

## **117. Records Management Procedure**

Fall, 2 credits

DOROTHY M. LUTTRELL and ROBERT H. LANDO

Instruction in basic practices and procedures for maintaining and servicing Government records including mail and messenger service. Includes detailed instructions and actual practice in methods of recording communications, and classifying, coding, indexing and filing correspondence and other documents. Designed for students who desire to enter this field or who are interested in supplementing their knowledge of the mechanics of record keeping.

## **217. Advanced Records Management**

Spring, 2 credits

DOROTHY M. LUTTRELL and ROBERT H. LANDO

Designed to give the student a comprehensive knowledge of the management of Government records. Principles of good records management; the organization and functions of records offices; planning and simplifying procedures; work flow; space arrangement; and system selection and installation. Also includes a discussion of laws and regulations governing preservation and disposal of records, appraisal, systematic retirement, storage, disposal and microphotography. *Prerequisite:* Records Management Procedure or equivalent or consent of instructor.

### **413. Office Management**

Fall, 2 credits. Repeated in Spring

DANIEL M. BRAUM

Designed to give supervisors and administrative assistants familiarity with the fundamental principles and methods needed by them to do a satisfactory management or supervisory job. Deals with the common day to day administrative problems and questions encountered by supervisors such as, (1) determination of space requirements and proper space allocation with due regard to flow of work; (2) the utilization and care of all existing facilities—equipment, labor saving devices, communications, etc.; (3) discussion of the effect of heat, light and ventilation on the morale and output of employees; (4) development and use of management tools in the Federal Government; (5) planning for improvements—how to secure participation by officials, supervisors and employees in suggesting and making improvements; and (6) a treatment of many management aides and devices not specifically covered in other Graduate School courses.

## **GOVERNMENT LETTER, REPORT, AND PROCEDURAL WRITING**

### **120. Government Letter Writing**

Fall, 2 credits. Repeated in Spring

VERNE L. SAMSON

The writing of clear, accurate, concise, courteous letters and memoranda contributes to efficiency and economy in administration. This course gives the student (1) opportunity to work out the principles of effective letter writing; (2) practice in criticizing and revising outgoing correspondence, and in planning and drafting replies to incoming letters; and (3) drill in the fundamentals of good writing.

### **420. Procedure Systems and Methods of Developing Instructions**

Fall, 2 credits

TEN M. F. ALLSMAN and RUSSELL O. HESS

A study of (1) various types of procedure or directives systems, (2) kinds of individual issuances, and (3) methods used in developing and writing instructions and procedures. Special attention will be given to the various types of survey methods and when to use them. The course will cover all steps in developing a procedure from the time of initial planning through the revision of installed procedures. Technical procedure functions (such as codifying and indexing), development of standards for editing and format, and types of visual presentations will be included. The purpose of the course is to provide a technical background for evaluating various procedure systems and methods for those students who will write procedures.

### **421. Writing Procedures and Instructions**

Spring, 2 credits

TEN M. F. ALLSMAN and KAY PEARSON

A course of instruction in how to develop and write manual issuances, circulars, office memoranda, and other forms of rules, regulations, instructions, and procedures. Special attention will be given to ways of improving readability of such material, the use of a clear, simple style of writing, proper format, and use of "ready-reference" aids. It will provide drill in the practical application of principles and theories of procedure to actual writing. The purpose of the course is to provide students with group experience in writing procedures and instructions and in applying editorial and format standards. *Prerequisite:* Procedure Systems and Methods of Developing Instructions or one year of experience in writing procedures at Grade GS-5 or above.

## 422. Systems for Reports and Forms Management

Fall, 2 credits

TEN M. F. ALLSMAN and ARTHUR BARCAN

Designed to provide students with a comprehensive knowledge of forms and reports management systems and how to operate them. A study of: various systems used for controlling forms and reports; different techniques used in Government for forms design and format; standards and printing specifications; methods for analyzing forms and reports; and how to install and operate forms and reports management programs. Analysis of forms and reports by case studies with group discussion of techniques involved. Special lectures by top technicians from representative Government departments.

### SHORTHAND

These courses are designed to furnish Federal employees an opportunity to follow a program of training for stenographic careers in the Federal service. While each course represents a separate unit of study, with emphasis on material used in the Federal service, a proper sequence of courses insures a sound foundation for successfully qualifying for the various grades and classifications of stenographers in the Federal service.

"Review of Gregg" will serve as rapid review for the student who has not applied his shorthand knowledge for a long time, or has used it so little that he feels uncertain about applying his knowledge to practical office dictation. Students finishing "Beginning Gregg Shorthand I" may continue with "Beginning Gregg Shorthand II" and then take "Gregg, 60 to 80 Words." Because the "Gregg, 100 to 130 Words" course is an intensive course on technical material, students should have a sound foundation in theory and be able to write 100 words a minute with a 95 percent accurate transcript before registering for the course. Home study is required to attain goals set in course descriptions. Amount of study required varies according to the learning habits and individual goals of students.

A prerequisite for all shorthand courses is the ability to type-write with a fair degree of accuracy and speed.

As a general guide to assist employees who wish to plan a course of study to build for a stenographic or stenographic-reporting career in the Federal service the following parallels are drawn:

<i>Course</i>	<i>Goal</i>	<i>Prerequisites</i>
Beginning Gregg Shorthand I	Ability to apply all the basic principles of Gregg Shorthand Simplified; mastery of all the brief forms; ability to read shorthand plates at a fairly rapid rate; ability to write legible outlines and to take dictation of new and practiced material.	For those who have not studied shorthand, or for those who have some knowledge of shorthand but have not completed basic theory.



<i>Course</i>	<i>Goal</i>	<i>Prerequisites</i>
Beginning Gregg Shorthand II	An increasing mastery of principles of Gregg Shorthand Simplified (by review and drill); ability to construct new shorthand outlines; ability to take dictation of new standard material at a minimum of 60 words a minute and to produce accurate transcripts.	For those who have completed Beginning Gregg Shorthand I or its equivalent.
Gregg Shorthand, 60 to 80 Words	Theory review; ability to take dictation at 80 words a minute for 5 minutes; ability to produce acceptable transcripts of letters and reports dictated at rates varying from 60 to 80 words a minute.	For those who have completed Shorthand I and II or equivalent theory and dictation courses and who have a minimum speed of 60 words a minute on new, standard material.
Gregg Shorthand, 80 to 100 Words	Ability to take dictation of new, standard material at 100 words a minute for 5 minutes; ability to produce, at a good rate of speed, accurate transcripts of letters, reports, conferences, and telephone conversations.	For those who have a minimum dictation speed of 80 words a minute and who are able to produce accurate transcripts of letters and reports.
Gregg Shorthand, 100 to 130 Words	Ability to take dictation of new, standard material at 130 words a minute for 5 minutes; ability to produce, at a good rate of speed, accurate transcripts of letters, reports, conferences, and telephone conversations.	For those who have a minimum dictation speed of 100 words a minute and who are able to produce accurate transcripts of letters and reports.
Introduction to Reporting—Gregg, 130 to 150 Words	Ability to record conferences and hearings 60 to 70 percent verbatim; introduction to reporting techniques.	For those who have qualified on 130-word a minute standard tests or their equivalent.
Reporting—Gregg, 150 Words and Up	Ability to use high-speed short-cuts and advanced reporting methods; verbatim reporting of lectures, hearings, and conferences.	For those who have qualified on 150-word a minute standard test or the equivalent.

## 89. Review of Gregg Shorthand

Fall, non-credit. Repeated in Spring and Summer

MILDRED R. STEPHENS

A review of theory and brief forms. Reading from shorthand plates and students' own notes; dictation of standard material at various progressive rates of speed. *Prerequisite:* Completion of the Gregg Manual or its equivalent by the functional system.

## 129. Beginning Gregg Shorthand I

Fall, 3 credits. Repeated in Spring and Summer

KATHRINE WILKEY



**130. Beginning Gregg Shorthand II**

Fall, 3 credits. Repeated in Spring and Summer

KATHRINE WILKEY

**225. Gregg Shorthand, 60 to 80 Words**

Fall, 3 credits. Repeated in Spring and Summer

ETHEL W. MORGAN

**226. Gregg Shorthand, 80 to 100 Words**

Fall, 3 credits. Repeated in Spring and Summer

RALPH ROWLAND

**231. Gregg Shorthand, 100 to 130 Words**

Fall, 3 credits. Repeated in Spring

MARIAN I. HARLIN

**335. Introduction to Reporting—Gregg, 130 to 150 Words**

Fall, 4 credits. Repeated in Spring

BERNARD P. FOOTE

**336. Reporting—Gregg, 150 Words and Up**

Fall, 4 credits. Repeated in Spring

ANNA M. PANICZKO

# Department of Physical Sciences

## DEPARTMENTAL COMMITTEE

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CHARLES E. KELLOGG

ARNOLD J. LEHMAN

MARK L. NICHOLS

HARRY WEXLER

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The courses in this department offer unusual opportunities for study under the guidance of scientists working in this field. The program will be of value to students who plan to enter these sciences; to those who desire to increase their knowledge of the science in which they now earn their living; and to those who wish, for cultural reasons, to learn more about these fields.

Some of the courses provide basic training together with the required laboratory work. Others, usually arranged as seminars, are designed to keep professional workers informed of recent developments in the field.

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*Course Numbers and Symbols*—Below 100, non-credit; 100–399, undergraduate; 400–699, graduate and advanced undergraduate (senior); above 699, graduate. Bracketed numbers, not given this year.

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## CHEMISTRY

[100.] **General College Chemistry** (1951–52 and alternate years)

ROBERT G. WILLIAMSON

### 248. **Organic Chemistry**

Year, 4 credits each semester (alternate years)

ROBERT G. WILLIAMSON

A study of the fundamental principles of organic chemistry, including electronic structure of organic compounds, resonance, classification, nomenclature, and type reactions. Emphasis is placed upon the importance of carbon compounds in present-day civilization (industry, chemotherapy, and biochemistry). The laboratory work consists of acquiring organic techniques, preparing typical compounds, and studying their characteristic reactions. The class meets in the Chemistry Laboratory of Wilson Teachers College, 11th and Harvard Streets, N. W. *Prerequisite:* General college chemistry.

### 400. **Advanced Organic Chemistry**

Year, 2 credits each semester

C. VERNE BOWEN

An advanced course in principles of organic chemistry. Reactions of the aliphatic, aromatic, carbocyclic and heterocyclic compounds will be considered. Newer developments will be presented. This course may be used as a refresher course. *Prerequisite:* Organic chemistry.

**[349.] Physical Chemistry (1951-52 and alternate years)**

BLAKE M. LORING

**312. Food Technology—Fruits and Vegetables**

Spring, 2 credits

LOWRIE M. BEACHAM

Basic principles of the chemistry of fruits and vegetables with special reference to their preservation by canning, freezing, drying, etc., and with emphasis on the requirements of the Federal Food, Drug, and Cosmetic Act. Variety and stage of maturity as related to the provisions of applicable standards of identity, quality, fill of container, and other official grades. Chemical and physical methods of measuring maturity and quality factors. Permitted flavoring, seasoning, and stabilizing ingredients. Chemical preservatives. Desirable and undesirable changes resulting from preservative processes. Advantages and limitations of various methods of preservation. Choice of methods with various classes of material. *Prerequisite:* Inorganic chemistry; a course in organic chemistry is desirable.

**[315.] Elementary Biochemistry (1951-52 and alternate years)**

CARTER D. JOHNSTON

**522. Advanced Biochemistry**

Year, 2 credits each semester

CARTER D. JOHNSTON

A detailed study of behavior and properties of enzymes; the nature of biological catalysis; hydrolytic, phosphorolytic, and oxidizing enzymes; intermediary metabolism of amino acids, carbohydrates, and fats; and photosynthesis. *Prerequisite:* Elementary biochemistry or consent of the instructor.

**545. Alkaloids, Glucosides, and Toxins of Biological Importance**

Spring, 2 credits (alternate years)

GEOFFREY WOODARD and SPECIALISTS

Subject matter covers items such as morphine, nicotine, ergot and quinine (cinchonidine) alkaloids; cardiac glycosides; snake venom, mushroom, honey and shellfish toxins; and toxins of bacterial origin. Emphasizes the relation of chemical structure to biological activity and methods of analysis, either chemical or biological. *Prerequisite:* Degree in biology or chemistry, or equivalent; knowledge of organic chemistry desirable.

**GEOGRAPHY AND GEOLOGY****420. Physiography of Eastern United States**

Fall, 2 credits (alternate years)

ESTHER J. ABERDEEN

A survey of the physiographic provinces and sections of the United States lying east of the Great Plains. The work of the course includes lectures, informal discussions, reviews of significant papers, and map studies, with special emphasis on the geologic foundations of land forms. *Prerequisite:* Courses in physical and historical geology.

**[421.] Physiography of Western United States (1951-52 and alternate years)**

ESTHER J. ABERDEEN

The following courses in geology are offered in cooperation with the United States Geological Survey and will be given in its well equipped laboratories. They are designed strictly for graduate students, and will enable employees to continue geologic studies while stationed in Washington. However, registration in these courses is not limited to employees of the Geological Survey.

The prerequisite for enrollment is a bachelor's degree in geology or the equivalent as an undergraduate major in geology from an acceptable institution; within this background, specific prerequisites are indicated under the course descriptions.

### 435. Elements of Physical Geology

Spring, 3 credits

To be announced

Minerals and rocks as constituents of the earth's crust; processes of weathering, erosion and deposition; vulcanism; structures of sedimentary and igneous rock formations; diastrophism; mountain building; land forms and their relation to various geologic processes; stability of the earth's crust. The courses includes classroom exercises in the study of common minerals and rocks, and interpretation of topographic and geologic maps. *Prerequisite:* Inorganic Chemistry.

### [640.] Principles of Ore Deposition (1951-52 and alternate years)

FRED M. CHACE and SPECIALISTS

### [641.] Advanced Dynamic Geology (1951-52 and alternate years)

WILLIAM T. PECORA and SPECIALISTS

### 642. Advanced Structural Geology

Spring, 3 credits (alternate years)

WILLIAM T. PECORA and SPECIALISTS

Includes deformational patterns of the earth's crust, regional metamorphism and orogeny, structural petrology, history and types of mountain building, and similar topics of structural geology. *Prerequisite:* Bachelor's degree in geology, with courses in general and historical geology, mineralogy, petrology and structural geology.

## SOIL SCIENCES

### 156. Soil Conservation

Spring, 2 credits

J. GORDON STEELE

The soil as a resource and why we need to conserve it. Brief review of physical features and land use in the United States as they affect soil conservation. Properties of soil and water. Erosion processes. Farm conservation plans, including the land inventory and the choice and application of conservation practices on the farm. Community action through soil conservation districts. Estimates of the conservation job. Outside readings and reports are assigned according to the interests and background of the students.

A knowledge of farming, and some previous training in earth sciences, biology or other related subjects are desirable but not essential.

**[157.] Soil Fertility and Management (1951-52 and alternate years)**

ROBERT Q. PARKS

**405. Soils—Their Origin and Geography**

Spring, 3 credits (alternate years)

CONSTANTIN C. NIKIFOROFF

A descriptive course covering the basic principles of the origin of the soil as a function of the environment and the pattern of distribution of various soils throughout the world. The role of soil formation in broad geochemical and geophysical cycles and the geographical factors of soil formation such as climate, relief, and biological pressure are first discussed in non-technical terms, followed by several lectures dealing with the physical nature of soil and the geographical analysis of the soil pattern of various parts of the world. The dynamic nature of soils and relationships between soils, climate and vegetation are emphasized throughout the course. *Prerequisite:* Freshman chemistry or its equivalent. Previous training in plant ecology, physical geography, and climatology is desirable.

**[531.] Soils: Their Morphology, Genesis, and Classification (1951-52 and alternate years)**

CONSTANTIN C. NIKIFOROFF

**560. Soil Physics**

Fall, 2 credits (alternate years)

C. S. SLATER

Deals with the physical properties of soils of importance to agriculture. Basic physical laws are applied to interpret soil phenomena. Topics include the soil entity, colloids, air and water relationships, structure, measurement of physical properties, relation of such properties to agricultural productivity, erosion and runoff, and modification of soil physical properties through use. *Prerequisite:* Degree in one of the sciences with courses in physics and chemistry, or permission of the instructor.

**METALLURGY**

**452. Principles of Physical Metallurgy**

Fall, 2 credits

BLAKE M. LORING

Development, meaning, and use of equilibrium diagrams for binary alloys. Iron-carbon diagrams and their relation to cast iron and steel, and to the critical points important in heat-treating ferrous alloys. Steel-treating processes depending on non-equilibrium conditions, including the TTT-Curve. Alloy steels. Aging and precipitation hardening. Segregation and other ingot defects. Mechanical and physical tests, including the interpretation of micrographs. Non-ferrous alloys of industrial importance. *Prerequisite:* College chemistry and physics.

**[526.] Advanced Physical Metallurgy (1951-52 and alternate years)**

BLAKE M. LORING

**528. Principles of Engineering Alloys**

Spring, 2 credits (alternate years)

BLAKE M. LORING

Manufacture, heat treatment, and special characteristics determining usage and availability of plain carbon steel, special steels, and non-ferrous alloys such as aluminum, magnesium and titanium. *Prerequisite:* Degree in engineering.



## METEOROLOGY

**162. Weather Survey**

Spring, 2 credits

WILLIAM H. HAGGARD

A non-technical course designed for persons interested in the general aspects of weather and for those concerned with the application of weather to their particular field of study.

The first part of the course includes weather instruments and observations, the properties, processes and general circulation of the atmosphere, storms, and climatic conditions of the United States. The use of daily maps and forecasts is discussed.

The second part is a survey of the effect of weather and climate on man and his activities, including agriculture, aviation, transportation, public utilities, business, industry, health and recreation.

**310. Methods in Climatology**

Fall, 2 credits

H. C. S. THOM

A study of modern climatological methods with emphasis on statistical analysis as applied to meteorological data. A knowledge of elementary statistics is helpful but not required.

**415. Applied Climatology**

Fall, 3 credits

WOODROW C. JACOBS

Course consists of a study of modern climatological methods as applied to the weather problems of business, industry and agriculture. A knowledge of the basic principles of meteorology is required but the essential statistical and climatological tools are developed within the course. Special problems are assigned in lieu of laboratory work. *Prerequisite:* A knowledge of elementary statistics.

**538. Elements of Dynamic and Synoptic Climatology**

Spring, 2 credits

WOODROW C. JACOBS

The methods of dynamic and synoptic meteorology are utilized to develop a theoretical global climatology. The causes of regional and seasonal variations in climate are emphasized. Climatological data are used only to verify theoretically derived climatic models. *Prerequisite:* Physical and Synoptic Meteorology or its equivalent, or consent of the instructor.

**533. Hydrology**

Year, 3 credits each semester

MAX A. KOHLER

A two-semester course in basic and applied hydrology at the professional level. The first semester will be largely descriptive, covering such topics as elementary hydraulics; measurement and interpretation of streamflow, precipitation and other basic data; the hydrologic cycle; physics of soil moisture; the infiltration theory; wave travel and the unit hydrograph. The second semester will cover the development and application of procedures for applying basic hydrology to practical problems of river forecasting and design of water control works including such subjects as streamflow routing, flood frequency, the rational method of estimating flood magnitude, hydrometeorology, forecasting of runoff, influence of water control structures on streamflow, and problems of water control operation. *Prerequisite:* Physics and algebra; elementary meteorology, statistics, and engineering desirable.

**[534.] Introduction to Dynamic Meteorology (1951-52 and alternate years)**

ROBERT J. LIST

[536.] **Physical and Synoptic Meteorology** (1951-52 and alternate years)

ALEXANDER L. SHANDS

**537. Weather Analysis and Forecasting**

Year, 3 credits each semester (alternate years)

THOMAS I. GRAY, JR., and JAY S. WINSTON

The principles of air mass and frontal analysis are applied to the analysis and prognosis of sea level and upper air weather charts for North America and adjacent areas. Standard forecasting methods are discussed, including objective forecasting techniques and forecasting with the aid of upper air data. Short range forecasts (up to 48 hours) are prepared for local and regional areas of the United States. Lecture and laboratory. *Prerequisite:* Physical and Synoptic Meteorology or consent of instructor.

[580.] **Advanced Weather Analysis and Forecasting** (1951-52 and alternate years)

THOMAS I. GRAY, JR., and JAY S. WINSTON

**PHYSICS**

**153. College Physics**

Year, 4 credits each semester (alternate years)

WILLIAM A. KILGORE

An introductory college course consisting of lectures, demonstrations, and individual laboratory work.

First semester: Mechanics, heat, and sound, with major emphasis upon the concepts of mechanics.

Second semester: Light, electricity, and electronics, with major emphasis upon electricity.

The class meets in the Physics Laboratory of Wilson Teachers College, 11th and Harvard Sts., N. W. *Prerequisite:* Two years high school mathematics and one year high school physics or equivalent.

[601.] **Ultrasonics** (1951-52 and alternate years)

EGON A. HIEDEMANN

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**NATIONAL BUREAU OF STANDARDS EDUCATIONAL COURSES**

The National Bureau of Standards has developed a series of courses to provide graduate training in physics. Although planned primarily for members of the staff of the National Bureau of Standards and given at the laboratories of the Bureau, these courses are open to other qualified students.

Besides these out-of-hours graduate courses, the National Bureau of Standards has many highly specialized in-hours courses to train staff members in their special work. Individuals from other Government agencies may be admitted to these courses on official request from their agencies.

Course information may be obtained from the Registrar, National Bureau of Standards.

# Department of Public Administration

## DEPARTMENTAL COMMITTEE

EARL W. LOVERIDGE (Chairman)

GLADYS L. BAKER

K. A. BUTLER

H. DEAN COCHRAN

PATTERSON FRENCH (Vice-chairman)

JOHN H. THURSTON

I. THOMAS MCKILLOP

WILLIAM A. MINOR

HARLOW S. PERSON

DON K. PRICE

## OPPORTUNITIES FOR STUDY AND WORK

The importance of public administration is apparent in the modern state with its emphasis on services, control, operation, and collective action in the public interest. The more the public service is called upon to assume functions previously exercised by individuals or private enterprise the greater the importance of the principles and techniques of public administration. Management problems raised by the war and its aftermath illustrate the critical need for more and better training in public administration, particularly in the junior and assistant positions, even in normal times. The increasing delegation of discretion to administrative agencies has raised unprecedented problems of organization, public consent, and administrative responsibility.

Washington is of necessity the national focal point of all these developments. Many of the ablest and most experienced public administrators are assembled in Washington. Many of the most competent practitioners of the various specialized branches of administration are likewise concentrated in Washington. Utilizing this unique environment and this unexcelled talent, the Graduate School offers courses geared to demonstrated needs and taught by experienced administrative personnel.

## SUGGESTIONS FOR PROGRAM OF STUDY

Courses in this Department cover a wide range of approaches for varying levels of responsibility. Some give background and attitude, and some give methods and skill. Some have their objectives high and broad for perspective and knowledge of relationships; some have their objectives comparatively narrow and sharply focused for skill and ability to perform particular tasks. It is hoped that students will select those courses which supplement and complement their work assignments rather than concentrate exclusively on more intensive training in the performance of daily tasks.

*General Administration.* Students whose livelihood and daily work are in public service, whose daily work is restricted to the

unique conditions surrounding public enterprise, are usually dependent on organized instruction on modern developments in management of private enterprise. The adaptation of these developments in the private field upon the organizations and procedures of public enterprise has sometimes had little and at other times a marked effect. A new series of courses has been added to bring together the scientific management developments of private industry and those of public enterprise in comprehensive and integrated training in general administration. These courses offer the student a basic and rounded training in administration, not exclusively concerned with existing organizations and procedures of Federal administration but combining pertinent experience that non-Government enterprise has to offer.

Students successfully completing this series of five courses will be awarded a special Certificate in General Administration.

In addition to these five courses, in general administration, the background courses in this Department provide a general foundation in American government and its legislative processes. They give the student an understanding of the theory and structure of our government and of democracy at work so that he, as a public servant, may better appreciate the paramount importance of the citizen. Knowledge of the way American citizens control their government and an understanding of the master-servant relationship between citizens and employees permits an intelligent handling of governmental affairs.

*Financial and Budgetary Administration.* Students desiring a knowledge of how the Government obtains, budgets and manages its money will find helpful several of the background courses and some of the courses in general administration as well as the specialized courses in this division. Those with limited experience in this field will wish to begin their study with Federal Budgetary Procedure, continue with Financial Organization and Procedures of the Federal Government, before attempting the advanced course in Budget Formulation and Budget Execution.

*Organization and Methods Analysis.* These courses are offered to afford students an opportunity for progressive study and advancement in the general field of organization and methods work (hereafter called O&M work).

The courses use to advantage, among other background data, the instructional and case materials developed by the Bureau of the Budget and by other Governmental agencies. A student progressing through these courses should develop a well balanced understanding of the principles, techniques, and administrative aspects of O&M work. The courses are designed for students with varying degrees of experience in this field.



Students interested in this area will find useful the scientific management courses under general administration; for scientific management as found in industry is, in part, translated and applied to Governmental operations.

*Personnel Administration.* The student is urged to begin with the background courses in public administration before concentrating on the program in this division. Unless substantial experience can be substituted, the general course, Public Personnel Administration, should be taken before the specialized courses (such as Position Classification, Selection and Placement, etc.). Persons who are in positions classified at GS-5 or below and desire to prepare for personnel work should begin with Federal Personnel Procedure; they should not attempt to take the specialized courses until they have gained substantial experience in personnel work or have carefully laid a foundation by completing all basic, general courses.

*Procurement and Property Management.* Courses in this area deal with how the Government purchases, manages and accounts for materials and supplies. Those interested in purchasing but with limited experience, will find it helpful to begin with the courses in Federal Purchasing Procedure and Federal Property Procedure before attempting the management courses.

Selected background courses in public administration together with courses in the Division of General Administration will provide a thorough training in administration in this area.

*Accounting and Auditing.* Students in classification grades below GS-5 will find it advantageous to begin with Federal Accounting Procedure or Federal Auditing Procedure. Preparation for higher-level accounting should begin with a year's study of Principles of Accounting, after the completion of which Federal Government Accounting may be taken. Intermediate Accounting, Cost Accounting, Auditing, Federal Tax Accounting, Advanced Accounting Problems, and Analysis and Interpretation of Financial Statements provide advanced training for those who desire to progress further with a general accountancy program. (See p. 77 for Certified Statement of Accomplishment in Accounting.)

COMMITTEE ON CERTIFIED STATEMENTS OF ACCOMPLISHMENT  
IN PUBLIC ADMINISTRATION

GLADYS L. BAKER (Chairman)

PATTERSON FRENCH

JOHN H. THURSTON

CERTIFIED STATEMENTS OF ACCOMPLISHMENT IN PUBLIC  
ADMINISTRATION

Certified Statements of Accomplishment are granted to undergraduate and to graduate students who have completed an organ-



ized course of study in public administration intended to provide basic training for responsible administrative work.

The programs leading to a Certified Statement of Accomplishment in Public Administration should be of special interest to:

1. Persons already employed in responsible administrative positions. Included in this group are many with specialized training who have been transferred to administrative positions from professional positions without training or previous experience in administration.
2. Junior Professional Assistants. Those who entered the service with a public administration option may profit from courses both more advanced and more specialized than those taken in college. Those who entered on various professional options and are now employed in such professions can profit very greatly from these courses if they expect, or wish to prepare, to enter into administrative work connected with their professional fields.
3. Employees who wish to broaden their understanding and improve their efficiency through a "tour of duty" by study, in lieu of an actual tour of duty for which they have found no opportunity.
4. Employees with college background who aspire to transfer to a career in administrative management.
5. Administrative assistants and administrative technicians of all kinds.

### *Approach*

Broad-gauge, essentially long-range approach to develop leadership, perspective, broad outlook, and understanding of the human factors in administration; emphasis on principles, with opportunity for study of some techniques in relation to policy.

### *Objectives*

Ultimately, for policy formulation, improvement of administrative machinery, coordination of operations, and general management and control of large units. Immediately, for initial investigations as a junior member of a staff having the responsibilities named above, for assumption of increasingly difficult and more responsible assignments in these fields, and for supervision and management of small units.

*Requirements—Undergraduate Study*

Requirements for Certified Statement of Accomplishment for Undergraduate Study in Public Administration:

1. Twenty-four semester hours of credit in college level courses in the social sciences. With the approval of the Registrar of the Graduate School, credit may be given for not more than six hours of other courses which are considered to be of value in connection with work in public administration (such as English literature, composition, philosophy, mathematics, or natural sciences). Introductory courses in the following must be taken:

American or European Government or Political Science  
Economics  
American or European History  
Public Administration

Much importance is attached to the general background courses in the belief that they help to broaden the thinking and understanding of the student so that he will possess a wider range of ideas and interests and sounder judgment of social values than would otherwise be the case and, in consequence, will be able to render Government service of a higher level of value than he would if he did not have such basic training. For this reason, these requirements will not be waived.

2. Twenty-four semester hours of credit in undergraduate and graduate courses in public administration, excluding all accounting courses except Federal Government Accounting. The 24 credit hours are to be distributed as follows:
  - a. A minimum of six credits from the Division of General Administration.
  - b. The remaining eighteen credits may be selected from the Divisions of Government-Legislative-Public Relationships, Organization and Methods Analysis, Financial and Budgetary Administration, Personnel Administration, Legal Administration, Procurement and Property Management, or additional general courses in public administration.

Upon prior approval by the Registrar, credit for courses outside the Department of Public Administration (including not more than two courses in office techniques and operations) may be applied when such courses are properly in line with the student's major interest.

*Students seeking this statement should consult with and obtain approval of their proposed course of study, from the Registrar, early in their academic program.*

### *Requirements—Graduate Study*

Requirements for Certified Statement of Accomplishment for Graduate Study in Public Administration:

1. Bachelor's degree. This requirement will be waived only in very exceptional cases when the student can offer educational accomplishments substantially equivalent to a Bachelor's degree and when he has demonstrated by appropriate examination the breadth of knowledge equivalent to such a degree in the social sciences.
2. Twenty-seven semester hours of credit in advanced undergraduate and graduate courses in public administration, of which ten hours of credit shall be for courses numbered 600 and above, and excluding all accounting courses except Federal Government Accounting. The 27 credit hours are to be distributed as follows:
  - a. A minimum of eight credits from courses in the Division of General Administration.
  - b. Sixteen credits may be selected from the Divisions of Government-Legislative-Public Relationships, Organization and Methods Analysis, Financial and Budgetary Administration, Personnel Administration, Legal Administration, Procurement and Property Management, or additional general courses in public administration.
  - c. Three hours of credit for the course, Readings and Papers in Public Administration.

Upon prior approval by the Registrar, credit for courses outside the Department of Public Administration may be applied when such courses are properly in line with the student's major interest.

*Students seeking this statement should consult with and obtain approval, from the Registrar, of their proposed course of study early in their academic program.*

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*Course Numbers and Symbols*—Below 100, non-credit; 100–399, undergraduate; 400–699, graduate and advanced undergraduate (senior); above 699, graduate. Bracketed numbers, not given this year.

## BACKGROUND COURSES

**341. American National Government**

Fall, 2 credits. Repeated in Spring and Summer

NORMAN J. SMALL

History and origins of the national Government of the United States; the political process—parties and elections; the legislative process; the functions of the national Government and their administration; courts and judicial review of legislation. Students are advised to take this course before Introduction to Public Administration.

**465. Views of Man and Society in the American Tradition**  
(See p. 95)**250. American History to 1865** (See p. 99)**251. American History Since 1865** (See p. 99)**344. Introduction to Public Administration**

Fall, 3 credits. Repeated in Spring and Summer

DAVID S. BROWN

This course is designed to introduce the student to the elements of public administration. Attention will be devoted to the evolution of administrative organization; organizational types: staff, line, and auxiliary agencies and functions; controls of administration; the broadest aspects of personnel selection, classification, training, movement, and relations; budgeting and fiscal control; federal-state relations; administrative legislation and adjudication. The object of the course is to lay a broad foundation for more intensive courses in management. *Prerequisite:* High school graduation or equivalent, or one course in the Clerical-Administrative Procedures Group, Department of Office Techniques and Operations. Desirable to have had American National Government.

**[570.] Management Responsibilities for the Administrative Scientist**

## DIVISION OF GENERAL ADMINISTRATION

**450. Principles of Scientific Management**

Fall, 3 credits

I. THOMAS MCKILLOP

Common functional elements of management. Definition of objective; organization; planning; coordination of execution through schedules, budgets, reports, and measurement of progress. Types of motivation. Historic management types. Types of organization. Personal relations and community relations in the several management types. Origin, nature and development of scientific management. Application of scientific management in enterprises outside of government. *Prerequisite:* Bachelor's degree; or a course in American government and a course in economics or another social science.

**540. Application of Scientific Management in Public Enterprise**

Spring, 3 credits

PHILIP C. WARD

The influence of underlying economic and social forces, operating within the structure and processes of a democracy, on organized conduct of public affairs. Major types of public agencies and basic differences between these types. Origin of purpose and policy in public enterprise. Comparison of public and



private enterprise as to motivation, objectives, purposes and establishment. Criteria of the quality of public administration. Application of the principles of scientific management in public enterprise including a study of the similarities and contrasts between public and private enterprise. *Prerequisite:* Principles of Scientific Management or equivalent.

### **545. Top Executive Leadership in Public Administration**

Spring, 3 credits

JOHN J. CORSON

The importance at all levels of administration of the quality of top control. The major problems of the chief administrator. Establishment of major and of component objectives, policies, and programs. Development of effective public relations, personnel and financial management.

Establishment of controls that result in adequate progress toward established standards, goals, and other objectives. Selection of controls and reporting systems. The budget as an instrument of control. *Prerequisite:* Principles of Scientific Management or equivalent.

### **550. Internal Organization Patterns, Relationships and Procedures of Public Agencies; the Function of Supervision**

Fall, 3 credits

PERRY R. TAYLOR

Detailed consideration of the relation of major subdivisions to top administration and to coordinate subdivisions. Problems of coordination in a decentralized organization geographically dispersed. Importance of clear definition of responsibilities and of vertical and horizontal relations.

The essence of supervision and of appropriate techniques. Coordination of activities, policies and objectives of component parts of an organization as an essential part of supervision. Establishment of standards and of procedures for measuring and appraising performance. Comparison throughout with corresponding responsibilities and procedures in private enterprise. Supervision as a problem of human relations. *Prerequisite:* Principles of Scientific Management or equivalent.

### **519. Work Standards and Work Measurement**

Spring, 2 credits

I. THOMAS MCKILLOP and WILFRED S. WILLIAMS

A study of the most advanced techniques of scientific management concerned with development of work standards and measurement of work loads and performance, and of their adaptability in public administration. Statistical and experimental methods of determining standards. Dangers to avoid in setting standards. Time study. Standards as a dynamic part of operations, and a tool in developing policies on personnel placement and training. Standards as aids in developing budgets, in planning operations, and in individual work planning. Importance of dependable standards, measurement and appraisal of performance to summary statements of progress for the use of higher administrative officials. *Prerequisite:* Practical working experience at Grade GS-7 or above, or permission of instructors.

### **600. Readings and Papers in Public Administration**

Fall, 3 credits. Repeated in Spring

JOHN H. THURSTON, Coordinator

Under the guidance of a senior administrative official, supervised readings with monthly conferences on specified topics of administration or individual research and a paper on some problem or phase of administration. Readings or problem to be investigated are determined in consultation with adviser. *Prerequisite:* Approval of the Registrar; completion of 12 hours of course work in public administration, including Introduction to Public Administration, with at least a B average. This requirement may be waived in the case of persons at Grade GS-9 or above who are engaged in administrative work.



## DIVISION OF GOVERNMENT-LEGISLATIVE-PUBLIC RELATIONSHIPS

## COMMITTEE ON GOVERNMENT-PUBLIC RELATIONSHIPS

R. LYLE WEBSTER (Chairman)

TRIS COFFIN  
 CLYDE HALL  
 OMER W. HERRMANN

ARTHUR ORR  
 MORSE SALISBURY  
 LYLE F. WATTS

**400. Administrative Operations for Congressional Assistants**

Spring, 2 credits

EVA B. ADAMS

This course deals with the practical administrative problems encountered by secretaries and other staff assistants to U. S. Senators and Congressmen. Such matters as the following will be considered: organizing the office routines; handling veterans' affairs; relations with the executive departments; the practical workings of Congress and assistance with legislative matters; pressure groups; relations with constituents; political organization and campaigns. Enrollment limited to employees of the Legislative Branch, except by consent of instructor.

**515. The Legislative Process**

Fall, 2 credits

GEORGE B. GALLOWAY

Information about the legislative process which will tend to facilitate effective cooperation between the personnel of the Legislative and Executive Branches. The functions of Congress; organization of Congress; consideration of bills in committees; consideration of bills on the floor; party leadership in Congress; the functions of the Executive regarding legislation; assistance by executive agencies in the legislative process; relation of non-governmental groups to legislation; legislative staff aids; congressional investigations of executive agencies as a control mechanism; correspondence, informational, and informal relations between Congress and executive agencies.

To give vitality and practical value to the subject, basic orientation lectures will be supplemented by seminar sessions, visiting experts, visual aids and planned laboratory techniques designed to provide active student participation in Congressional processes. *Prerequisite:* Undergraduate degree plus special occupational interest in the legislative process.

**710. Government Public Relations**

Fall, 2 credits

R. LYLE WEBSTER and SPECIALISTS

An examination of public relations activities in Federal agencies today; Federal publications trends; field relationships; review of successful use of information media and group contact activity in Federal public relations; development of individual plans of work directed toward specific problems encountered by participants in their daily duties.

Designed to give information workers an overall picture of the scope of the public relations responsibilities of a Federal agency. Provides specialists in press, radio, visual, and other information media with an understanding of the total informational and public relations needs of an agency; prepares such specialists for broader responsibilities. Useful, also, to administrative and scientific workers who look forward to executive positions, in giving an appreciation of the public relations responsibilities of administrators. *Prerequisite:* Limited to persons in the Federal information field and to persons with or preparing for broad responsibilities in scientific or administrative work.

## DIVISION OF ORGANIZATION AND METHODS ANALYSIS

## COMMITTEE ON ORGANIZATION AND METHODS ANALYSIS

HAROLD A. STONE (Chairman)

IVAN ASAY

NORMAN G. ASBURY

N. ROBERT BEAR

HARVEY E. BECKNELL

WILLIAM R. DIVINE

GERMAN S. ELLSWORTH

WILLIAM A. GILL

EDWARD W. HARDING

**405. Principles and Techniques of O & M Work**

Year, 2 credits each semester

DAVID D. LEVINE and JOHN D. YOUNG

Deals with the principles and techniques employed in surveying and analyzing organization and methods problems and in formulating solutions for such problems. Emphasizes: planning and conducting various types of surveys; organizing and presenting survey facts; forms analysis; establishing effective relationships; the human element in O&M work; ways of dividing work and controlling work flow; presenting recommendations; installing new methods; follow-up. *Prerequisite:* Applicants will file at the time of registration a statement of their reasons for taking the course. Preference will be given to those engaged in O&M work; registration will be accepted from those not now engaged in O&M work and such persons will be admitted insofar as facilities permit.

**420. Procedure Systems and Methods of Developing Instructions**

(See p. 51)

**519. Work Standards and Work Measurement**

(See p. 68)

**585. Establishing and Administering O & M Work**

Fall, 2 credits

HAROLD A. STONE and JOHNSTON E. LUTON

Deals with the problems of establishing and administering organization and methods work. Covers the way an agency gears itself to improve management to bring about efficiency and economy of operations. Includes responsibilities and authorities of an O&M unit; relationships within and without the bureau, department and the Government; scope of O&M work; control and management of survey projects; long and short term programs of work; selecting staff; gaining acceptance of recommendations. Emphasis is placed upon different sets of circumstances encountered in O&M work. Cases are presented both by students and by instructors. This course is designed for persons who wish to expand their knowledge of the administrative phases of O&M work. It is essential therefore that they have previous education or experience or both in the practical application of its techniques. *Prerequisite:* Completion of courses in the principles of O&M analysis and consent of instructor, through Graduate School office.

## DIVISION OF FINANCIAL AND BUDGETARY ADMINISTRATION

**[525.] Financial Organization and Procedures of the Federal Government**

CARL W. TILLER

**360. Hospital Business Administration I: Accounting, Statistics and Finance**

Fall, 2 credits

DAVID H. SPANIER and SPECIALISTS

Principles of hospital fund accounting; general fund income, expense and balance sheet accounts; temporary and endowment fund accounts; plant fund ac-

counts. Adjusting and closing entries; prepaid and deferred items; preparation of trial balances. Hospital patient and hospital service statistics. Hospital financial and statistical statements. Cash receipts and accounts receivable procedures. Cash disbursements and accounts payable procedures. Inventories. Credits and collections. Payroll and personnel procedures. Check lists of equipment and supplies; depreciation; reserves. *Prerequisite:* Principles of Accounting or the equivalent in experience.

### **361. Hospital Business Administration II: Cost Analysis Methods and Budgeting**

Spring, 2 credits

DAVID H. SPANIER and SPECIALISTS

Principles of hospital cost analysis methods, rate structures and budgeting. Detailed cost analysis problems, organization of accounting department, principles of internal control and food cost accounting. *Prerequisite:* Hospital Business Administration I or its equivalent in experience.

### **116. Federal Budgetary Procedure**

(See p. 49)

### **635. Budgetary and Financial Administration: Budget Formulation**

Fall, 2 credits

RALPH S. ROBERTS, JOSEPH C. WHEELER and STAFF

First part of an advanced, two-semester program for experienced budget-staff personnel. Covers the broad phases of budgetary and financial administration in the Federal Government primarily from the standpoint of the operating department.

The course deals with the pre-appropriation phases of budgeting, including formulation, review, and congressional enactment of the budget. Topics discussed include: the role of budgeting in program formulation; the role of bureaus, departments, Bureau of the Budget, the President and Congress in budgeting; content of the budget and of departmental estimates and related budgetary materials; the investment and capital-outlay budgets; review and analysis of budget estimates; budget justification; legislative-administrative relationships in budgeting. *Prerequisite:* Bachelor's degree and an introductory course in public administration; or experience at a responsible level in budgetary, financial or general administration; or consent of instructor.

### **636. Budgetary and Financial Administration: Budget Execution**

Spring, 2 credits

RALPH S. ROBERTS, JOSEPH C. WHEELER and STAFF

This is the second part of an advanced two-semester course covering the broad phases of budgetary and financial administration in the Federal Government. Several officials from bureau and department budget offices and other budgetary and financial organizations lecture and lead discussions.

This semester deals with the execution of the budget after it is enacted by Congress and the relationships of administrative planning and control, accounting, auditing, and financial reporting to budget execution. *Prerequisite:* Bachelor's degree and an introductory course in public administration; or experience at a responsible level in budgetary, financial or general administration; or consent of instructor.

## DIVISION OF PERSONNEL ADMINISTRATION

## COMMITTEE ON PERSONNEL ADMINISTRATION

H. DEAN COCHRAN (Chairman)

MILDRED C. BENTON  
 JAMES L. BUCKLEY  
 L. M. CORRELL  
 VIRGIL L. COUCH  
 C. O. HENDERSON

G. E. HILBERT  
 HAROLD LEIGH  
 ARTHUR B. MCLEAN  
 ROSS POLLOCK  
 JOSEPH E. WINSLOW

**430. Public Personnel Administration**

Fall, 2 credits. Repeated in Spring

VIRGIL L. COUCH

Designed for supervisors and administrators wishing to have general familiarity with personnel work, for those in junior personnel staff positions desiring a broad understanding of personnel administration, and for those desiring to enter the field who need a foundation for the more specialized courses in the personnel field. Personnel problems which arise when people are associated together in a work situation; basic personnel policies and practices necessary and useful in treating personnel problems; differences between responsibilities, with respect to personnel administration, of the supervisor and the personnel officer; the various phases of personnel work; study of merit system and forms of organization; civil service legislation at various governmental levels; relationships between the Civil Service Commission and operating agencies and personnel offices of latter; trends in public personnel administration and its relationship to overall management. *Prerequisite:* One of the following: Introduction to Public Administration; Course 108 or 114 in the Department of Office Techniques and Operations; Grades GS-4 or above in personnel work; 60 semester hours of college work.

**435. Selection and Placement**

Fall, 2 credits

ELINOR HAYES

Survey of the historical development and current thinking and practices in recruitment, selection, and placement of employees, with special reference to the Federal civil service. Emphasis in lectures and discussion is directed toward understanding basic principles which underlie policies and methods in public employment, with only incidental attention to the development of skills in such specific techniques as interviewing, examination preparation and administration, and reemployment investigation. The course is intended for students who wish to understand the "why" of public selection and placement procedures, rather than for those primarily interested in how such procedures are carried out. *Prerequisite:* One of the following: Course 344 or 430 in Public Administration; Grade GS-4 or above in personnel work; 60 semester hours of college work.

**437. Tests and Measurements**

Spring, 2 credits

HAROLD L. MCADOO

The application of psychological tests, rating scales, interviews and other devices in modern personnel administration. Topics covered: the theory of measurement; reliability and validity of measuring devices; construction, use and interpretation of tests; types of aptitude, achievement and personality tests; and the use of rating scales and standardized interviews. *Prerequisite:* A course in general psychology and one in statistics, or the equivalent as approved by the instructor.



### 445. Position Classification I—Elementary

Fall, 2 credits. Repeated in Spring and Summer

WILLIAM C. LAXTON and JOSEPH P. FINDLAY

Covers the fundamental concept of position classification and its uses; the relation of classification to compensation and other phases of personnel. An analysis of the Classification Act of 1949. *Prerequisite*: One of the following: Courses 344 or 430 in Public Administration; Grade GS-4 or above in personnel work; 60 semester hours of college work.

### 446. Position Classification II—Advanced

Fall, 2 credits. Repeated in Spring

WILLIAM C. LAXTON and JOSEPH P. FINDLAY

Covers methods of position classification; the application of position classification in the Federal Service, including operating policies, practices and procedures; and the analysis and application to specific positions of factors determining class and grade levels. *Prerequisite*: Position Classification I or experience in position classification subject to the approval of the instructor.

### 580. Classification Administration

Fall, 2 credits (every third year)

JAMES L. BUCKLEY

Includes analyses and discussions of: policy development and execution in administering the Federal position classification plans; the place of the Civil Service Commission, Bureau of the Budget, Congress and Congressional committees in the policy and in other phases of position classification; policy coordination between position classification and other phases of personnel management and general administration; strengths and weaknesses of the present Federal classification system. *Prerequisite*: Knowledge of the technical principles of Federal position classification gained either through formal study or through actual work experience.

### 305. Fundamentals of Accident Prevention

Fall, 2 credits

ROBERT L. JENKINS

Designed for those in junior staff positions desiring a broad understanding of accident prevention, for those desiring to enter the field who need a foundation for the more specialized courses in accident prevention, and for supervisors and administrators wishing to have general familiarity with accident prevention work. Covers basic approaches to accident prevention; division of responsibilities; technical, economic and social aspects of the accident problem; organization and mechanics of an accident prevention program; and established techniques for reducing accidental wastes in all work programs.

### 565. Employee Relations and Employee Services

Fall, 2 credits

ASTRID W. KRAUS

This course defines the basic content of an employee relations program. Deals with the formulation of employee relationship policies; the development and application of grievance and other appeals procedures; the techniques for sharing information with employees, for handling employee discipline and for assisting supervisors to appraise and deal with employee problems; the provision of essential employee services, such as housing, child care, transportation, recreation, health and educational information, and so forth, necessary to recruit and maintain an adequate work force. Discussion will also be devoted to the relationship of Government as an employer to its employee groups; the history of union-management relationships in the Federal service; present day problems of affiliation, "collective bargaining" and areas of negotiation on policy formulation and settlement of employee grievances. *Prerequisite*: College degree or personnel work at Grade GS-7 or above or consent of instructor.



## 515. Sociology and Psychology of Group and Community Relations (See p. 97)

### 575. Law of Federal Personnel Administration

Fall, 2 credits (alternate years)

RALPH F. KOEBEL

Designed to furnish the legal background for courses 430 and 582. Study of legal problems arising out of the Classification Act of 1949 and other statutory sanctions for Federal employment. Particular topics include: legal aspects of appointment; rates of compensation; hours of employment; overtime pay; promotion; and classification. The effect of wartime legislation on the foregoing matters and on the employment rights of returning veterans will be emphasized. *Prerequisite:* One of the following: Course 344; Course 430 or 582; Grade GS-5 or above in personnel work; 60 semester hours of college work.

### 550. Internal Organization Patterns, Relationships and Procedures of Public Agencies; the Function of Supervision (See p. 68)

### 582. Personnel Division Management (1951-52 and alternate years)

VIRGIL L. COUCH

## DIVISION OF LEGAL ADMINISTRATION

### COMMITTEE ON LEGAL ADMINISTRATION

ASHLEY SELLERS (Chairman)

THOMAS J. FLAVIN

RALPH F. KOEBEL

DAVID REICH

### 320. Introduction to Administrative Law and Procedure

Fall, 2 credits

EDWARD C. JOHNSON

A survey, for the general student, of the nature of administrative law, its subject matter, and methods of administration. The rule-making and adjudicative or determining procedures by federal and state regulatory agencies and the remedies against administrative action receive special consideration.

The increased complexity of modern society has meant that administrative tribunals have played an expanding role in the regulation of life and property. This course includes a study of the law which controls and the regulations which are made by governmental officers to implement that law. A survey of economic and social forces involved in regulatory action. Material used includes regulations, orders and decisions of federal, as well as state and municipal bodies, which acquaints students with current developments in administrative law and procedure. Topics covered include: powers and duties of administrative authorities as they relate to the supervision of public, as well as private interests; means of enforcing decision; remedies against official action; legal qualifications for office; legal disqualification of officers; appointment, tenure, removal and compensation of officers; and related matters.

### 425. Legal Aspects of Investigation—Criminal Evidence and Procedure

Spring, 2 credits

RALPH F. KOEBEL

Designed to prepare investigative personnel and those desiring to prepare for such work, a background and insight into the legal aspects of their investigations: what types of evidence to seek; circumstances and conditions under which the evidence is to be obtained in order to have adequate probative value;

and how to prepare such evidence for presentation in court or other procedure. Since all investigations are potential sources of prosecution, the requirements of criminal evidence and procedure often reach into the early stages of investigation. The instruction is designed to provide understandable information without overemphasis of technical aspects.

## [680.] Administrative Law

ASHLEY SELLERS

### 480. Copyright Law

Spring, 2 credits (alternate years)

LOUIS C. SMITH

Fundamentals of the law of copyright. Covers broadly the subject of legal protection afforded an author's writings, both textual and pictorial. Special emphasis on the history of copyright law in the United States; copyright relations with foreign countries; the procedure to secure copyright; the practices, rules and regulations of the United States Copyright Office; the rights of a user of an author's work; assigning and licensing copyrights; the infringement of copyright and its penalties; and a study of the problems which have arisen in the fields of motion pictures, radio and such new media as microfilm, television and ultrafax, as well as other subject matter of copyright including books, periodicals, works prepared for oral delivery, music and works of art.

Special consideration given to Government publications; the United States Government as copyright owner and as user of copyrighted works; and copyright problems which may directly affect the Government employee. *Prerequisite:* College degree or equivalent experience.

### 820. Problems of Federal Administrative Regulation

Spring, 2 credits

THOMAS J. FLAVIN

A seminar for advanced students using the case approach to consideration of the Administrative Procedure Act and its application to all areas of Federal regulation covered in that Act. *Prerequisite:* Extensive experience in regulatory work, with approval of instructor; or a degree in law, public utilities or public administration.

### 422. Business Law

(See p. 78)

## DIVISION OF PROCUREMENT AND PROPERTY MANAGEMENT

### COMMITTEE ON PROCUREMENT AND PROPERTY MANAGEMENT

JAMES SCAMMAHORN (Chairman)

WILLIAM E. FEE  
CLIFTON E. MACK  
CHARLES E. OFFUTT

S. A. SNYDER  
FRANK H. SPENCER  
RAY WARD

### 455. Management of Governmental Supply

Spring, 2 credits

JAMES SCAMMAHORN

An advanced course covering the broad phases of handling and managing Government supply activities. Especially useful to employees engaged in budget and personnel activities who need general knowledge of supply office functions. Deals with supply policies, organization and management, finances, and laws governing supply. Topics: (1) organization and management of purchasing offices; (2) organization and management of warehouses; (3) property accounting,

management and distribution of supplies and equipment; (4) management and training of purchasing and warehousing personnel; (5) procurement function efficiency determination and importance of project service objective and its relation to good Government purchasing and warehousing; (6) decisions of the Comptroller General and regulations affecting procurement; (7) nature of public contracts as compared with private contracts; (8) Federal Specifications and specification studies, including development and writing; (9) delivery requirements, inspection of supplies and liquidated damages; (10) market analysis and conditions which affect seasonal project work of Government bureaus; (11) laws which affect procurement contracts such as Walsh-Healey Act, Davis-Bacon Act, Eight-Hour Law; (12) functions of General Accounting Office, Federal Supply Service, Federal Prisons Industries and surplus disposal agencies in the supply scheme; (13) traffic problems and transportation studies on methods of shipment; (14) new developments in procedures affecting supply and dissemination of information to field supply units. *Prerequisite:* One of the following: Introduction to Public Administration; Federal Purchasing Procedure; Federal Property Procedure; Grade GS-4 or above in purchasing work; 60 semester hours of college work.

## DIVISION OF ACCOUNTING

### COMMITTEE ON COMMERCIAL AND GOVERNMENTAL ACCOUNTING

WILLIAM H. ROWE (Chairman)

PAUL L. APPELMAN  
WARNER H. HORD  
LAWRENCE O. MANLEY

CHARLES N. MASON  
ROBERT W. MAXWELL  
HERSCHEL C. WALLING

The Graduate School offers accounting courses primarily as a means of training for the *public* service. The curriculum necessarily includes courses in general accounting because the basic principles are essential for Government accounting.

The scope of accounting in the Federal service is wide. There are increasing demands for accountants having a knowledge of commercial as well as Government accounting. These demands have come as a result of the formation of many Government corporations and Federal regulatory agencies. Hence, the accounting program required for a Certified Statement of Accomplishment is broad enough to cover not only the regular appropriation accounting of the Federal Government, but also the accounting training needed for many other governmental activities. The program is comprehensive enough to meet both advanced training for the Government service, and also, if courses are carefully selected, the usual educational requirements for C.P.A. examinations. Students planning to take C.P.A. examinations should know the requirements of the state in which they plan to take the examination. In general, their study, in addition to accounting, should include the following: Principles of Economics, Corporation Finance, Investments, Mathematics of Finance, Business Law, Statistics, Business English, Principles of Marketing and Industrial Management.

## CERTIFIED STATEMENT OF ACCOMPLISHMENT IN ACCOUNTING

*Requirements*

1. High school diploma or equivalent.
2. Thirty-six semester hours of credit in courses outlined below and distributed as follows:
  - a. All of the required courses.
  - b. No less than three semester hours credit from the Accounting Elective Courses.
  - c. No less than six semester hours credit from the Related Elective Courses.
  - d. The remaining six semester hours credit may be taken in either of the two elective groups.

COURSES LEADING TO CERTIFIED STATEMENT OF ACCOMPLISHMENT  
IN ACCOUNTING

## REQUIRED COURSES

<i>Courses</i>	<i>Number of Semesters</i>	<i>Semester Hours Credit</i>
Principles of Accounting .....	2	6
Intermediate Accounting .....	2	6
Cost Accounting .....	1	3
Auditing .....	2	4
Advanced Accounting .....	1	3

## ACCOUNTING ELECTIVE COURSES

Federal Government Accounting .....	1	3
Federal Tax Accounting .....	1	3
Analysis and Interpretation of Financial Statements .....	1	2
Mathematics of Finance .....	1	3
Federal Accounting Procedure .....	1	3
Federal Auditing Procedure .....	1	2
or Advanced Federal Auditing Procedure .....	1	2
Budgetary and Financial Administration .....	2	4
Advanced Accounting Problems .....	2	6
Accounting Systems .....	1	2
Cost Accounting (Second Semester) .....	1	3

## RELATED ELECTIVE COURSES

Business Law .....	2	4
Principles of Economics .....	2	6
Principles of Statistical Analysis .....	2	6
Writing Procedures and Instructions .....	1	2
or Introduction to Official Writing .....	1	2

**352<sup>a</sup>. Principles of Accounting—First Half**

Fall, 3 credits. Repeated in Spring and Summer

HERBERT G. MARSHALL  
WILLIAM H. ROWE

Elementary principles of accounting; discussion and problems. At the end of the semester students will be prepared to do the accounting necessary for a small business organization; i.e., keep a complete set of books, draw up state-



ments at the end of the fiscal period, adjust the accounts for accruals, deferred items, depreciation, etc., and close the books. *Prerequisite:* High school graduation or equivalent.

### **352b. Principles of Accounting—Second Half**

Spring, 3 credits. Repeated in Summer

HERBERT G. MARSHALL  
WILLIAM H. ROWE

Continuation of first half covering more advanced principles of accounting; accounting for partnerships, corporations and manufacturing; depreciation policies and analysis of financial statements. *Prerequisite:* First half or equivalent.

### **360. Hospital Business Administration I: Accounting, Statistics and Finance**

(See p. 70)

### **361. Hospital Business Administration II: Cost Analysis Methods and Budgeting**

(See p. 71)

### **353a. Intermediate Accounting—First Half**

Fall, 3 credits

WARNER H. HORD

Advanced principles of manufacturing accounting, corporation accounting, and valuation as applied to current assets, fixed assets, intangibles, and liabilities, reserves and funds, installment sales. *Prerequisite:* A first year course in accounting.

### **353b. Intermediate Accounting—Second Half**

Spring, 3 credits

WARNER H. HORD

Advanced principles of partnership accounting, including formation, operation, and dissolution; joint ventures; consignments; agencies and branches; application of funds. *Prerequisite:* First half or equivalent.

### **354. Federal Government Accounting**

Fall, 3 credits. Repeated in Spring

CHARLES N. MASON

A review of the development of the accounting system for Federal funds and the present financial organization in which the accounting is performed with attention to the accounting responsibilities of each segment of the organization, including the Treasury Department and the General Accounting Office. Detailed study is given to the accounting problems of administrative agencies with special emphasis on general ledger controls and financial reporting problems. *Prerequisite:* One year of Principles of Accounting, or Federal Accounting Procedure and one semester of Principles of Accounting or equivalent.

### **420. Advanced Accounting**

Fall, 3 credits

LAURENCE W. ACKER

Advanced principles of accounting, consolidated statements; foreign exchange; receivership; estates and trusts; budgets; public accounts. *Prerequisite:* Intermediate Accounting or equivalent.

### **422. Business Law**

Year, 2 credits each semester \*

EDWARD C. JOHNSON

Aspects of law essential to the conduct of modern business. Forms of business organization, bailments, property, sales, mortgages, negotiable instruments, contracts. *Prerequisite:* Intermediate Accounting or equivalent.

\* This course is so arranged that students may attend both semesters or either semester. No subject matter, however, will be repeated.

**423. Mathematics of Accounting and Investment**

Spring, 3 credits

RALPH R. BOTTS

Calculation of compound interest, compound discount, sum of annuities, present value of annuities and perpetuities; accumulation of sinking funds and amortization of debts by installments. Calculation of bond yields, bond values, premiums and discounts. Computation of depreciation by sinking fund method and fixed percentage of book value method. Some study is given to life probabilities and the computation of premiums and reserves for the more common types of life insurance and annuities. Accounting applications and entries will be discussed for those students interested in the accounting aspects.

**510. Analysis and Interpretation of Financial Statements**

Spring, 2 credits

LAURENCE W. ACKER

Study of the flow or movement of funds as reflected in the financial statements. Use of ratios and other indices in the analysis and interpretation of financial position together with a consideration of trends and variations therein. Subject matter is developed through lectures and problems, supplemented with published financial statements. Each student prepares, under supervision of the instructor, an analysis of the current financial statements of some prominent corporation together with a comparison with the principal competitors in the field. *Prerequisite:* Intermediate Accounting.

**[642.] Cost Accounting (1951-52 and alternate years)**

ALFRED D'ALESSANDRO

**645. Federal Tax Accounting**

Fall, 3 credits

EUGENE C. MOYER

Federal taxation presented from the accounting viewpoint. Special attention given to income taxation. *Prerequisite:* Principles of Accounting; accounting experience desirable.

**[646.] Advanced Accounting Problems**

LAURENCE W. ACKER

**693. Auditing**

Year, 2 credits each semester

JOHN C. COOPER

The fall semester is devoted to the study of the fundamental principles of public or commercial-type audits. Consideration is given to the purposes and types of audits; the responsibility of the auditor; planning and performing audits. Special emphasis is placed on problems in audit theory and practice such as are generally given in C.P.A. examinations.

In the spring semester, emphasis is placed on case studies in auditing and the application of audit principles. Special consideration is given to the field of internal audit as a tool of management and the utilization of internal audit in Government. *Prerequisite:* Intermediate Accounting.

**694. Specialized Federal Accounting Systems**

Fall, 3 credits

EDWIN T. NOLAN and SPECIALISTS

Designed to acquaint the students with the basic principles and standards of systems design and with current developments and improvements in Federal accounting. The systems of a diversified group of Federal agencies are used as case studies. *Prerequisite:* Intermediate Accounting, Federal Government Accounting, and Cost Accounting, or the equivalent.

**[695.] Accounting Systems**

EDWIN T. NOLAN

# Department of Social Sciences

## DEPARTMENTAL COMMITTEE

SHERMAN E. JOHNSON (Chairman)

FOSTER F. ELLIOTT  
H. DUNCAN HALL  
PAUL E. NYSTROM  
HAROLD B. ROWE

CARL C. TAYLOR  
J. MURRAY THOMPSON (Vice-chairman)  
HARRY C. TRELOGAN  
FREDERICK V. WAUGH

## PURPOSE AND SCOPE

Social science deals with people and the problems of human relationships, as contrasted with natural or physical science which deals with things and the problems arising out of physical relationships.

The problems of social organization and operation have become both absolutely and relatively more important with the increase in complexity of our industrial civilization. More and more, people are concerned with the organization of production, the distribution of goods and income, and with price policies. The individual as a consumer and investor, the businessman and the farmer as producers, find increasing need for a knowledge of economics and other social sciences. Large corporations are employing growing numbers of economists to help in the formulation of policy. Psychologists and social workers are finding a demand for their services in personnel work. And, the large number of Federal, state and local government agencies need more people adequately trained in social science.

Social science is divided into a number of closely allied fields including economics, sociology, political science, history, law, and psychology. A broad grasp of any one of these subjects implies at least some familiarity with the others, because of the many interrelationships among these studies. Yet the continued development of each social science has given rise to larger and still larger bodies of knowledge relating to it, until only through a considerable degree of specialization can the student hope to master any one part. Thus the great need is for people who have concentrated sufficiently on one phase of a social science, such as marketing in economics, to be thoroughly familiar with the details of fact and principles involved, yet who also have a broad underlying training in the allied fields.

The courses offered by the Graduate School are designed to aid in acquiring a general background in the social sciences, as well as the specialized training in particular fields which is necessary for successful work in many Government departments and in private business. Some courses are included that are of interest outside of

a person's field of work or specialization. For example, the course, Introduction to the Study of Human Relations, is of interest to all persons who desire a better understanding of human behavior as a basis for their day to day contacts with other people. A course in Managing Personal Finances will be useful to persons who are faced with problems of owning a home, investing current savings, or making decisions with respect to the type of life insurance best suited to their special needs.

But not all of those engaged in occupations connected with the social sciences can hope to attain a complete general as well as specialized background, at least for some time to come. They will be interested, rather, in courses designed to fit them better for doing some specific job which is not connected with research, policy formation or general administration. An employee in the personnel office of a Department of Agriculture branch responsible for market news and inspection services may wish to take a course in marketing in order to learn something about the subject matter dealt with by the personnel of the branch, or a course in psychology as an aid in dealing with the personal problems which are daily presented to employee counselors. The secretary to an economic research director may want a course in the principles of economics in order to become familiar with the terminology and general economic concepts to which her stenographic and filing duties relate. An almost unending array of job needs of this kind offers opportunities to the alert and ambitious employee to increase his capacity and usefulness to his employer. The many promotions within the Government service which can be traced directly to such training testify to the fact that study in the social sciences is profitable.

#### GROWING NEED FOR TRAINED WORKERS

It is extremely important that Government policies, relating to the economic and social life of the Nation, be based on competent studies of the probable effects of alternative lines of action. To forecast accurately what will happen and to point out clearly the good and bad effects which may result from any proposed course of action is the major service which social scientists may render to the people of this country.

Washington is an excellent place to study problems of this kind. The principal Federal programs in the economic and social fields are administered in Washington and new proposals constantly are being considered both by the Congress and by the agencies responsible for the administration of those programs. Moreover, Washington is growing in importance as a center for the discussion and actual administration of international programs.



## SUGGESTIONS FOR PROGRAM OF STUDY

To meet the specific needs of students who have different educational and experience backgrounds and different immediate interests, the Graduate School has developed the following types of courses in the social sciences:

- (1) *Courses of General Interest.* Several of the social science courses are designed to provide information of general interest to a large group of persons who desire to broaden their background along certain lines. Some of these courses have been developed to meet the needs of persons who do not expect to become specialists in a particular field, but who desire to obtain some background in a subject, as a basis for work in related fields, or purely as a personal interest. The courses that meet the general interest needs of students are usually not of graduate level.
- (2) *Undergraduate Basic Courses.* These courses are designed to provide a basic social science background for students who have not completed their undergraduate training or who have not had an opportunity to take the basic background work in economics and the other social sciences as a part of their qualification for Bachelor's degree work. These courses provide an opportunity for persons who enter the Government service in the lower grades to prepare themselves for professional advancement.
- (3) *Graduate and Advanced Undergraduate Courses.* These courses offer work of graduate level but they are also open to undergraduates of advanced standing. Students who are registered for graduate credit will be expected to do more work in these courses than those who register for undergraduate credit.
- (4) *Strictly Graduate Courses.* These courses are offered only for graduate students who have adequate background. They are usually conducted on a seminar basis and they require a great deal of participation and preparation of material by the students themselves.

The Graduate School does not offer either undergraduate or advanced degrees, but it is possible for a student who is interested in working toward a degree to organize his work in the Graduate School in such a way that he will fulfill some of the requirements of the institution where he expects to obtain a degree. If possible, the course of study should be outlined in consultation with advisers at the institution where the student expects to take his degree. Stu-

dents who have not decided on the institution where they expect to complete their work but who wish to specialize in economics or in one of the other social sciences should select basic courses leading toward degree work, in consultation with designated advisers of the Graduate School.

*Basic Undergraduate Courses for a Major in Economics.* Students working toward a Bachelor's degree with specialization in economics should plan to complete the following courses either in the Graduate School or at some other institution:

- |                                       |                      |
|---------------------------------------|----------------------|
| 1. Principles of Economics            | 3. Economic History  |
| 2. Principles of Statistical Analysis | 4. Money and Banking |
| 5. Public Finance                     |                      |

In addition to these courses, the students looking forward to concentration of work in agricultural economics should plan to complete undergraduate courses in Economics of Marketing and Economics of Farm Production. An elementary course in accounting should also be included if the student plans to major in prices and marketing. Undergraduate students who expect to major in one of the other social sciences should consult designated advisers in the Graduate School.

*Graduate Courses.* Students working for graduate degrees should consult educational advisers in the institution where they expect to receive their degree. If they have not selected such an institution they should confer with advisers in the Graduate School who are teaching in the particular field in which they expect to concentrate. In general, students who wish to map out a course of study leading toward a graduate degree should plan their work to include:

- (1) Completion of basic undergraduate courses.
- (2) Advanced courses in social science fields related to the particular field of concentration. For example, a student majoring in economics should consider advanced courses in statistics, economic history, sociology or some other related field in order to broaden his educational background.
- (3) Advanced courses in the field of concentration. Students who expect to major in one of the social science fields should begin their graduate work by taking the basic graduate courses in that special field. For example, students who expect to major in any field of economics should plan to take at least six credits of work in advanced economic theory and

six credits in monetary and cycle theories. With these courses as a foundation, the student can begin to specialize in courses in his particular field of concentration.

—O—

*Course Numbers and Symbols*—Below 100, non-credit; 100–399, undergraduate; 400–699, graduate and advanced undergraduate (senior); above 699, graduate. Bracketed numbers, not given this year.

—O—

## GENERAL ECONOMICS

### COMMITTEE ON GENERAL ECONOMICS

BUSHROD W. ALLIN (Chairman)

ROY J. BURROUGHS  
JAMES P. CAVIN

JOHN CORDON DAVIS  
HOWARD L. PARSONS

HOWARD S. PIQUET

Adequate foundation training in general economics is essential for satisfactory accomplishment in the study of any specialized branch of the subject. Hence, the primary objective in developing the following list of courses has been that of providing the basic work needed, by students who wish to carry out a systematic plan of study, at both undergraduate and graduate levels. In addition, a course on research methods is listed under this head. It is of general interest to students majoring in economics.

## 110. Introductory Survey of Economics

Summer, 2 credits

BUSHROD W. ALLIN

A mountain-top view of economic history, institutions, statistics, and analysis. Descent into the numerous valleys that invite detailed exploration is left to later courses. The course is a useful introduction for the student who wishes to take the subsequent year's course in *Principles of Economics*. It serves also to introduce the subject to those who will take no more formal economics but for whom life itself is the textbook.

## 201. Principles of Economics

Year, 3 credits each semester

ROY J. BURROUGHS

A basic course designed to equip the student with the simpler tools of economic analysis and with an understanding of the more important institutions of the economic system. Economic analysis is developed with respect to operations of the price system, behavior of individual consumers and business firms, and also the behavior of the total economy including the allocation of resources, the distribution of the total product to the factors of production and the conditions which favor high employment and a large national income. *Prerequisite:* A year of college work or its equivalent.

**335. Introduction to Economics, Theory and Institutions**

Fall, 2 credits

BUSHROD W. ALLIN

This course is largely a study of the place of collective action in economic theory. Institutions are defined as collective action in control of individual action. These take the forms of corporations, trade unions, farm organizations and decisions of the Supreme Court. Theory is interpreted as referring to mental tools useful for understanding and dealing with contemporary economic and social problems. *Prerequisite:* Principles of Economics or equivalent.

**418. Public Finance and Taxation**

Spring, 2 credits (alternate years)

TYLER F. HAYGOOD

Government revenues, expenditures, debts, financial administration and fiscal policy; taxation; equity in distribution of tax burdens, shifting and incidence of taxation; types of taxes, excise, income, property, excess profits, etc. *Prerequisite:* A course in economics.

**480. Money and Banking**

Year, 2 credits each semester (alternate years)

RICHARD A. RADFORD

The principles of money. The value of money. Effects of changing price levels. Money, credit, and capital. Significance of the rate of interest. Fundamentals of monetary policy. Evolution of the banking system. The money-market. Principles of Central Banking. The Federal Reserve System. Quantitative and qualitative credit control. Banks and the creation of credit. Effects of the war on the banking system. Inflation and deflation. International monetary standards. International monetary relations. *Prerequisite:* Principles of Economics or equivalent.

**610. Advanced Economic Analysis**

Fall, 3 credits

HOWARD L. PARSONS

Deals intensively with economic theory as a tool of analysis for problems of production, consumption, the market, and the aggregate economy. Analytical models, such as the firm, the industry, the household, and Keynes' General Theory, form the core of the discussions.

The specific focus of the course is on the ways of thinking and factors considered by individuals and group in the economy as they choose among alternative economic actions. As a part of these considerations, special attention is given to understanding the effect of particular institutions, such as different forms of government, price control, production control, etc., on these choices. *Prerequisite:* A course in principles of economics.

**[705.] History of Economic Thought (1951-52 and alternate years)**

MAX J. WASSERMAN

**706. Modern Economic Thought**

Spring, 3 credits

BUSHROD W. ALLIN and JAMES P. CAVIN

A review of the ideas of the leading economic theorists of the past fifty years, including those of Marshall, Veblen, Commons, Mitchell and Keynes. *Prerequisite:* Principles of Economics or equivalent.

**728. International Financial and Trade Policies**

Fall, 2 credits (alternate years)

OSCAR ZAGLITS

Discussions, with particular attention to postwar developments, of policies in the fields of (a) international trade (especially the General Agreement on Tariffs and Trade and the Charter of an International Trade Organization), (b) in-



ternational finance (including direct United States lending and Export-Import Bank activities) and (c) foreign reconstruction and development (including Economic Cooperation Administration programs and the new program for assistance in development of underdeveloped areas).

Attention is given to financial policies of the United States as they relate to operations of international economic organizations such as the Economic and Social Council of the United Nations, United Nations Food and Agriculture Organization, International Monetary Fund, International Bank for Reconstruction and Development, and international commodity councils. Guest speakers will participate. *Prerequisite:* Graduate training or equivalent experience as approved by instructor.

[712.] **Research Methods in Social Sciences** (1951-52 and alternate years)

O. C. STINE and SPECIALISTS

**325. Managing Personal Finances**

Fall, 2 credits. Repeated in Spring

HARALD C. LARSEN, assisted by  
RALPH F. KOEBEL

Renting versus owning a home; costs of home ownership; methods and mathematics of financing; characteristics of deed, abstract, mortgage, trust, contract, and notes; financing durable and other consumer goods; sources and costs of consumption credit and installment buying; characteristics of major types of investments, stocks, bonds, debentures, mortgages, notes, savings accounts, and property; provisions for retirement, Federal retirement system and options, social security and other retirement systems. Insurance: choosing a company, features of principal life insurance and annuity contracts, protection versus savings, nonforfeiture privileges, settlement options, and property, liability and other insurance programing. Planning and administration of estates, joint ownership, laws of intestacy, making a will, administration of estates as executor or administrator, proof of will, costs and fees.

**AGRICULTURAL ECONOMICS**

**COMMITTEE ON AGRICULTURAL ECONOMICS**

BENNETT S. WHITE (Chairman)

PHILLIP F. AYLESWORTH

FLOYD E. DAVIS

R. W. JONES

HORACE R. JOSEPHSON

HAROLD B. ROWE

ROBERT M. WALSH

The great importance of enlarging and improving knowledge of the economics of agriculture is generally recognized. Constructive accomplishment in this field requires thorough training in economics combined with a comprehensive grasp of its application to the special conditions of agriculture. Such a balanced combination can best be achieved by following a systematic course of study appropriate to the particular area of concentration desired. The courses offered by the Graduate School permit students to carry out such plans of study with concentration in the economics of agricultural production, agricultural finance, prices, and marketing. The electives and general interest courses provided also permit the adaptation of study plans to meet the special interests of individual students.

Shortage of well-trained marketing personnel, at both Federal and State levels, critically handicaps developing a well-rounded program under the Agricultural Research and Marketing Act. The greatest immediate need is for men with advanced training who can undertake independent work in new fields. The broad expansion of activities scheduled under the Act also will continue and intensify the need for adequately prepared college graduates. On both problems the Department of Agriculture is cooperating closely with land-grant institutions. Joint committees have analyzed and mapped out attack on these problems. As part of this plan the Graduate School has given special advanced training to Washington personnel engaged in marketing work, and this year provides its full complement of regular courses in this field.

#### CERTIFIED STATEMENT OF ACCOMPLISHMENT IN AGRICULTURAL ECONOMICS

The Graduate School offers a Certified Statement of Accomplishment to students who have completed 30 credits of graduate work in agricultural economics, including the basic graduate courses in economics. To qualify, it is necessary to follow the specific sequence of courses that are listed for three fields of concentration indicated below.

The Certified Statement of Accomplishment is not an advanced degree, but it constitutes evidence of completion of an organized course of study in the field of agricultural economics. It is a certification that the student has completed a program of study which prepares him for effective public service in agricultural economics work. The Graduate School plans to extend the granting of Certified Statements of Accomplishment to other social science fields as there is sufficient demand.

#### COURSES LEADING TO CERTIFIED STATEMENT OF ACCOMPLISHMENT IN AGRICULTURAL ECONOMICS

##### *(With Concentration in Specified Fields of Application)*

##### *Economics of Production*

##### *Agricultural Finance*

##### *Prices and Marketing*

#### BASIC UNDERGRADUATE COURSES

Required foundation courses. Carry undergraduate credit only and may not be used to meet the credit hour requirement for the certified statement. Equivalent courses will be accepted by transcript from other institutions.

The number in parenthesis after course title indicates semester hour credits.

Principles of Economics (6)	Principles of Economics (6)	Principles of Economics (6)
Principles of Statistical Analysis (6)	Principles of Statistical Analysis (6)	Principles of Statistical Analysis (6)
Economics of Farm Production (3)	Economics of Farm Production (3)	Economics of Farm Production (3)
Introduction to Marketing (3)	Introduction to Marketing (3)	Introduction to Marketing (3)

## REQUIRED BASIC GRADUATE COURSES

Advanced Economic Theory (6) Money and Banking (4)    Advanced Economic Theory (6) Money and Banking (4)    Advanced Economic Theory (6) Money and Banking (4)

## REQUIRED SPECIALIZED GRADUATE COURSES

Farm Management (2)	Agricultural Finance (3)	Economics of Marketing (4)
or		
Land Economics (4)	Farm Management (2)	
Agricultural Policies (2)	or	
	Land Economics (4)	
Economics of Production (3)	Agricultural Finance (3)	Agricultural Policies (2) Marketing (3)

## ELECTIVE GRADUATE COURSES

Select courses in consultation with Graduate School advisers to complete the 30 graduate credits required for certified statement of accomplishment.

**207. Economics of Farm Production**

Fall, 3 credits (alternate years)

KENNETH L. BACHMAN

Designed to develop the economic principles of production and to relate these principles to practical farm problems; including their application in the determination of the proper combination of production resources, the selection of enterprises and the explanation of variation in agricultural production in different areas. A brief survey of the application of such principles in achieving optimum production.

**409. Farm Management**

Spring, 2 credits (alternate years)

WYLIE D. GOODSELL

An advanced course in farm organization and management which combines development of economic principles of farm production with practical application to the planning and operation of farms of different types, sizes, and locations. The practical and theoretical aspects of purchasing, organizing, operating, and managing farms are treated. Consideration is given also to economic adjustments needed in specific farming areas and for the nation. *Prerequisite:* Economics of Farm Production, or equivalent.

**410. Land Economics**

Fall, 3 credits (alternate years)

V. WEBSTER JOHNSON

A survey of economic principles governing utilization of major land types, including an appraisal of present land resources and future need for various types of land and land uses; traditional practices and customs that affect land use; private and public land ownership and tenancy relationships; problems of new settlement; land income under different conditions of ownership and management; and various state and local measures for the direction and control of land use and occupancy. *Prerequisite:* Principles of Economics and experience as approved by instructor.

**[411.] Agricultural Finance (1951-52 and alternate years)**

DONALD C. HORTON

**[412.] Risk and Insurance (1951-52 and alternate years)**

E. LLOYD BARBER, DONALD C. HORTON, and RALPH R. BOTTS

**719. Resource Utilization Problems and Policies**

Spring, 2 credits (alternate years)

V. WEBSTER JOHNSON and HORACE R. JOSEPHSON

A seminar in conditions, problems, and public policies in the utilization and conservation of natural resources, with particular reference to current policies and programs. Discussions cover agriculture, grazing, forests, water resources,

strategic minerals, and other important natural resources. Integrated topics include river basin development, utilization of tropical resources, population in relation to resources, and similar subjects. *Prerequisite:* Graduate work in related areas, or experience as approved by instructors.

## 720. Economics of Production

Spring, 3 credits (alternate years)

SHERMAN E. JOHNSON and ASSOCIATES

A seminar dealing with special problems in the broad field of economics of production. Students will be expected to prepare papers on problems of interest in their special fields. Different research workers and administrators participate in the discussion of current problems under the guidance and coordination of the instructor. *Prerequisite:* Background of graduate work and approval of instructor.

## [721.] Agricultural Finance (1951-52 and alternate years)

NORMAN J. WALL and RUSSELL C. ENGBERG

## 203. Introduction to Marketing

Fall, 3 credits (alternate years)

BENNETT S. WHITE

A preliminary course intended to provide orientation for the study of marketing as (1) a type of production which supplies essential services, and (2) a valuation process in which the prices of agricultural commodities are established. Marketing machinery costs, functions, methods and practices are surveyed. Marketing specialists of the Department of Agriculture will lead discussions relating to particular commodities and special problems. *Prerequisite:* Principles of Economics or the equivalent.

## 414. Economics of Marketing

Year, 2 credits each semester (alternate years)

H. M. SOUTHWORTH and HARRY C. TRELOGAN

An advanced course in which economic aspects of marketing agricultural commodities are systematically analyzed, with main emphasis on applying modern economic concepts to the successive problem areas developed. The first semester considers marketing, including transportation, storage, processing, and distribution, as a process of production. It explores the use of resources in this production, the effects of market institutions and organizations upon the use of resources and the productive services performed, and the criteria of efficiency of this productive process and of public policy designed to improve it. The second semester considers the market as a mechanism for establishing prices. It explores the functions of market prices, the process of price-making, the effects of market organization and practices, and the relationships between margins and the costs of productive services in marketing, and the criteria of efficiency in price-making and of public measures that regulate or intervene in the price-making process. *Prerequisite:* Principles of Economics and Introduction to Marketing, or equivalent as approved by instructors.

## 530. Methods of Price Analysis

Year, 2 credits each semester (alternate years)

RICHARD O. BEEN and ROBERT M. WALSH

A survey of the main price problems in agriculture and in marketing and consumption of farm products; a critical analysis of recent developments in economic theory and in statistical techniques and their use to measure the effects of various factors influencing prices; and a study of the accuracy and usefulness of price forecasts. Attention is given to Government price, production and marketing programs and to trade practices and market organization as they affect the prices of farm products at various stages in the marketing process. Emphasis is placed on developing proficiency in application of price analysis methods. *Prerequisite:* Principles of Economics, and Statistical Analysis of Economic Relationships or a course in statistics which included correlation analysis.



## LECTURES ON AGRICULTURAL MARKETING

Fall and Winter

1950-51

### **Functions and Objectives of Marketing**

O. V. WELLS, Bureau of Agricultural Economics

### **Science and Marketing**

E. C. STAKMAN, University of Minnesota

### **Agricultural Marketing in the National Economy**

F. V. WAUGH, Council of Economic Advisors

### **Public Costs and Benefits from Marketing Research and Service**

C. W. KITCHEN, United Fresh Fruit and Vegetable Association

### **Industry Research in Retailing Agricultural Products**

WILLIAM APPLEBAUM, Stop and Shop, Inc.

### **Consumer Education Required for Rational Marketing**

CHARLES E. ESHBACH, Extension Service

### **Increasing Operational Efficiencies in Marketing**

MAX E. BRUNK, Cornell University

### **Nature and Consequences of Competition in Marketing Agricultural Commodities**

WILLIAM H. NICHOLLS, Vanderbilt University

### **Diffusion of Commodities through the American Marketing System**

BASIL LIVINGSTON, British Export Trade Research Organization

### **Marketing Regulations in Agriculture**

GEORGE L. MEHREN, University of California

### **Government Services as Aids to Better Marketing**

S. R. SMITH, Production and Marketing Administration

### **Costs and Margins Research**

D. B. DELOACH, Bureau of Agricultural Economics

### **A Visualized Program for Marketing**

CLIFFORD R. HOPE, Representative from Kansas

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These lectures will be given at 4:00 P.M. in Jefferson Memorial Auditorium. No registration required; no fees charged. Open to employees and the general public. A special announcement, giving lecture dates, will be made later.

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#### *Committee*

HARRY C. TRELOGAN, Chairman

H. M. SOUTHWORTH

BENNETT S. WHITE

ROY W. LENNARTSON

**[722.] Marketing (1951-52 and alternate years)**

HARRY C. TRELOGAN

**750. Farm Price Policy**

Fall, 2 credits (alternate years)

ORIS V. WELLS

Seminar for advanced students professionally interested in the behavior of farm prices and income, agricultural marketing charges, and the development of related agricultural policies. The adaptation or development through time, and the probable effect, of views of outstanding economists and agricultural leaders are critically examined. Credit is awarded on the basis of class discussion and papers submitted on special subjects. *Prerequisite:* Graduate work in prices or economics of marketing, or comparable experience as approved by the instructor.

**407. History of Agricultural Policy in the United States**

Year, 2 credits each semester

EVERETT E. EDWARDS

An introductory historical survey of agricultural policies from the first settlements to recent times; the principal forces shaping agricultural policies in past periods; the interrelationships of agricultural policies and contemporaneous economic and social theories and policies. Given as a reading course.

**416.] Agricultural Cooperation (1951-52 and alternate years)**

MARTIN A. ABRAHAMSEN, HAROLD HEDGES and STAFF

**[716.] U. S. Agricultural Policies and Programs (1951-52 and alternate years)****COOPERATIVE EXTENSION EDUCATION****COMMITTEE ON COOPERATIVE EXTENSION EDUCATION**

CANNON C. HEARNE (Chairman)

LOA E. DAVIS

ARTHUR L. DEERING

D. BARTON DELOACH

ERWIN C. ELTING

DOUGLAS ENSMINGER

FRED C. JANS

PAUL E. NYSTROM

Cooperative extension education consists of the off-campus, non-resident teaching service of the land-grant institutions in cooperation with the USDA and the leadership of a county. It is the largest non-school educational program in the United States. The growing interest on the part of county agents, supervisors, specialists, and administrators in cooperative extension work as a profession has led the Graduate School to appoint a committee on Cooperative Extension Education. This committee has the responsibility for giving guidance to students toward a program best suited to the individual's needs, within the framework of the Graduate School. This program may well lead to an advanced degree depending upon the plans of the student and the cooperative arrangements available through the Graduate School. A separate leaflet is available describing the courses listed below, which will be given as the demand justifies, and showing also a general framework of courses of interest to cooperative extension people.

**450. Methods and Techniques**

2 credits

GLADYS G. GALLUP and OTHERS

**451. Extension Education for Foreign Students**

3 credits

FREDERICK P. FRUTCHEY

**596. Development of Programs**

2 credits

CANNON C. HEARNE

**535. Basic Evaluation, Research Methods and Techniques**

2 credits

LAUREL K. SABROSKY, FREDERICK P. FRUTCHEY and OTHERS

**620. Administration and Supervision**

2 credits

M. C. WILSON

**695. Problems in Cooperative Extension Education**

6 credits

CANNON C. HEARNE

**HEALTH AND MEDICAL SERVICES**

COMMITTEE ON HEALTH AND MEDICAL SERVICES

RAYMOND C. SMITH (Chairman)

ELIN ANDERSON

MELVIN T. JOHNSON, M.D.

MARGARET C. KLEM

T. WILSON LONGMORE

The wide-spread interest in improving the organization and administration of health and medical services is well illustrated by the growth of prepayment plans for medical care, such as those in industry and those sponsored by consumer and professional groups, and by active discussion of proposals for a comprehensive national health service. Developments such as these have focused attention on the need, in areas both of governmental and voluntary activity, for greater emphasis on exchange and dissemination of information and experience among those in this field, and for equipping personnel now in or preparing to enter this work with information and techniques essential to effective operation.

**050. Health and Medical Service Problems, Policies and Programs**

Fall, non-credit

MARGARET C. KLEM and ELIN ANDERSON

Bi-weekly discussions cover subjects in which the group indicates a special interest and may include such topics as development of local public health services, health planning on a community and minimum regional basis, proposals on child health in connection with the Mid-Century White House Conference on Children and Youth, present status of work and possible future developments under the Hospital Survey and Construction Act, rural health planning, and fundamental concepts in various health and medical programs. The seminar may continue during the spring term. *Prerequisite:* Consent of the leaders. No fee is charged; registration, however, is required and is limited to professional personnel in one or more fields mentioned.

## HUMAN RELATIONS

COMMITTEE ON HUMAN RELATIONS

CARL C. TAYLOR (Chairman)

JOHN M. BREWSTER  
LILY BRUNSCHWIGFORREST E. CLEMENTS  
DOUGLAS ENSMINGER

IRENE B. TAEUBER

Courses in human relations are planned to meet the needs of four types of students: (1) those who wish a general rather than specialized knowledge of social problems and processes; (2) those who wish substantial first undergraduate courses in sociology, anthropology, and psychology; (3) those who wish specialized undergraduate and graduate courses in these same fields; and (4) mature persons who wish courses which use the knowledge of all social sciences in considering public issues and policy.

Introduction to the Study of Human Relations is designed to meet the needs of the first of these types of students. Views of Man and Society in the American Tradition is representative of courses designed to meet the needs of the fourth class of students. Most of the other courses are standard college undergraduate and graduate courses in their respective fields.

Undergraduate students who have not had general orientation in the field of sociological sciences should enroll in Introduction to the Study of Human Relations so that, during the progress of the course, they may decide which of the specialized subject matter fields they care to pursue further. Most of the first courses in specialized fields of psychology, sociology, and anthropology are so placed as to give students who take this basic course the opportunity to pursue their specialized interests in a following semester.

Special attention is called to the rounded program of courses offered in Population. They are designed to meet the needs of two groups: (1) those who wish a broad but nontechnical understanding of the significance of increasing population in relation to natural resources, occupational opportunities, social security, etc.; and (2) those who wish to develop a detailed understanding of the composition and dynamics of population and, among these, the ones who after taking the basic courses wish to take more advanced technical courses to prepare themselves for professional work in the field of population.

Population of the World in Relation to Resources is designed to meet the first of these needs. The course has no prerequisite because it is assumed that it may be taken by either elementary or mature students in keeping with their desires to understand better the growing concern about population problems. All the other



courses are designed to meet the needs of the second group. They form a sequence, as indicated by the prerequisites, and include both courses focused on method and courses focused on content.

The courses on population statistics, Courses 448, 449, and 700, present the statistical methods by which population data are analyzed. They are offered jointly by the Department of Social Sciences and the Department of Mathematics and Statistics. The population curriculum emphasizing the substantive aspects of population includes Courses 444, 446, and 702. The entire group of population courses represents a wider range of offerings in this field than is known to exist in any other academic institution in the United States.

### **105. Introduction to the Study of Human Relations**

Fall, 2 credits. Repeated in Spring and Summer T. WILSON LONGMORE

A study of the contributions of the various social sciences, but especially sociology, psychology and anthropology, to an understanding of human behavior. An integrative course for students who have not had an opportunity to study any of the sociological sciences. Designed to acquaint students with techniques and principles used in describing and analyzing human relations. Should not be taken by students academically prepared to do advanced work in this field.

### **210. General Psychology**

Fall, 3 credits. Repeated in Spring LYNN E. BAKER and CHARLES LIMBURG

A study of the basic patterns of human behavior, instincts, habits, ideas and attitudes. The course begins with a thoroughgoing analysis of the human nervous system and concludes with an analysis of personality.

### **215. General Sociology**

Spring, 3 credits T. WILSON LONGMORE and ARTHUR F. RAPER

A basic and general study of social problems and processes with special emphasis upon such problems as population, race, poverty, crime, divorce, etc., and group processes such as organization, leadership, public opinion, etc.

### **220. Introduction to Cultural Anthropology**

Spring, 3 credits FORREST E. CLEMENTS

The origins of human culture, its historical development, language and culture, culture processes and principles of culture change. Stresses psychological factors in the acquisition and perpetuation of culture and analyzes human behavior as a resultant of innate and culturally acquired traits.

### **301. Population of the World in Relation to Resources**

Fall, 2 credits To be announced

A broad, nontechnical course for persons with a general interest in population, especially for those who are specialists in other fields. Emphasis is placed on a balanced interpretation of the historic growth and distribution of the world's population, the present balance of births and deaths in various countries, and the prospects for population growth or stabilization in relation to the social, economic, and resource factors. Considerable attention is given to interpretation of population trends and prospects in the United States, with evaluation of population forecasts.

**332. Contemporary National Cultures**

Fall, 2 credits (alternate years)

EDWARD A. KENNARD

Cultural backgrounds and behavior characteristics of different racial and national groups. Differences between these and American cultural and behavior patterns; phases in greatest conflict and likely to lead to misunderstanding. Use of cultural analysis in developing and administering international programs to the end that cultural conflicts can be recognized and identified. The course is adapted particularly to those concerned with developing and administering programs in foreign countries.

**465. Views of Man and Society in the American Tradition**

Spring, 3 credits

JOHN M. BREWSTER

A study of the central viewpoints in the American Tradition—their origin and role in shaping public policy. Chief objectives: (1) to analyze the views of man and society held by the commercial and landed aristocracies during the American Revolutionary Period; (2) to show how these views (a) influenced the formation of the Constitution and the program of Hamilton and Jefferson and (b) became transformed, during the Age of Jackson, into the Ideal of the Self-Made Man and its creed of democratic capitalism; and (3) to show ways in which this ideal and creed were carried over into the Machine Age and today are commonly used as a basic test of proposed solutions for contemporary problems. Various American and European statesmen are used to illustrate the development and application of these central viewpoints in our tradition. *Prerequisite:* Bachelor's degree or equivalent.

**400. Introduction to General Semantics**

Fall, 2 credits. Repeated in Spring

J. A. SAUNDERS

A study of this new methodology, the application of the investigative methods of the physical sciences, through extensional devices and techniques based on mathematical theory, to the social sciences, particularly individual and group relationships. Discussion of Korzybski's theories of human agreement, human progress, sanity and happiness. Applications of general semantics to case situations.

**40. General Semantics Workshop**

Year, non-credit

J. A. SAUNDERS

Limited to 20 Students

For persons wishing to continue their study of general semantics and extensional methods of evaluation, particularly as focused on case situations. The workshop will include: practical exercises in applying principles of general semantics to everyday personal and professional problems; information exchange on practical applications made by participants; study of practical applications made by other groups and individuals; laboratory training in applying extension techniques to change our "minds," to keep concepts current, and to employ democratic procedures and extensional evaluation methods in reaching agreements. *Prerequisite:* Introduction to General Semantics or equivalent or approval of instructor.

**421. Rural Sociology**

Fall, 3 credits

ARTHUR F. RAPER

The application of modern sociological methods to the study of rural life. A generalized course covering the whole field of rural sociology, but a specialized sociological course in the sense that it deals altogether with the rural society, rural institutions, rural social organization, rural cultural differences and cultural variations in American rural life. *Prerequisite:* A college course in the social sciences.

**426. Urban Sociology**

Spring, 3 credits (alternate years)

ARTHUR F. RAPER

A systematic presentation of the rise and decline of cities; the social ecology of metropolitan areas; the selective aspects of urban migration; the impact of the city upon personality and group life; the organized social and political life of the city; and the planning and control of urban society. *Prerequisite:* A college course in the social sciences.

**433. Social Psychology**

Spring, 3 credits

DOUGLAS ENSMINGER

A general course on the social aspects of personality, social interaction and collective behavior. It includes treatments of cultural conditioning of personality, personality measurement, communication, public opinion, propaganda, censorship, mobs, riots, and social movements. An individual project is required for the third credit. *Prerequisite:* A course in general psychology or equivalent.

**[439.] Child and Adolescent Psychology (1951-52 and alternate years)**

LILY BRUNSCHWIG

**441. The Conditions of Personality Growth**

Fall, 2 credits (alternate years)

LILY BRUNSCHWIG

This course treats the principal factors influencing personality development: physiological bases, infantile and childhood experiences, and cultural determinants. It considers both experimental and clinical contributions to the theory of personality and the application of those to practical problems of interpreting and dealing with people. *Prerequisite:* A course in general psychology or equivalent.

**442. Personality Disorders**

Spring, 2 credits (alternate years)

ALBERT C. CORNSWEET

This course through lectures and case discussion will deal with personality variations as seen among normal people, stressing the significance of such variation in social and occupational adjustment, and with major types of abnormal personalities with emphasis on recognition of these deviations. Designed to help meet the needs of placement officers, counselors and others who through interviews or other media must recognize and deal with problems of emotional maladjustment. *Prerequisite:* A course in general psychology or equivalent.

**444. Population: Population Problems and Prospects in the United States**

Spring, 3 credits

IRENE B. TAEUBER and MARGARET J. HAGOOD

A study of the composition and dynamics of the population of the United States, with particular attention to rural-urban and regional differentials. Familiarity with basic sources and methods of population statistics is assumed and the emphasis is on the interpretation of the statistical measures. Levels and differences in rates of growth, mortality, fertility, and migration, and their analysis in relation to social, biological and psychological factors, and especially in relation to rates of industrialization and economic development. Appraisals made earlier of the population prospects for the United States are carefully re-examined in the light of recent developments in fertility, mortality, and migration, with stress placed on the meanings revealed by the newer technical measures of population replacement. *Prerequisite:* Population Statistics I.

**446. Labor Force and Manpower Analysis**

Spring, 3 credits (alternate years)

LOUIS J. DUCOFF and A. J. JAFFE

Study of the size, composition, and changing characteristics of the labor force and manpower. Working force theory and concepts of labor force and manpower. Problems of measurement of employment and unemployment levels and the interpretation of such statistics. Occupational, industrial, and class of worker composition and changes. Problems of geographic and occupational mobility in the light of factors facilitating or impeding mobility. The demographic socio-economic, and technological factors bringing about labor force and manpower changes. *Prerequisite:* Population Statistics I.

**448. Population Statistics I: Basic Sources and Methods**

Fall, 3 credits

JACOB S. SIEGEL

Basic sources of population data in the United States. History of collection and quality of data. Basic methods of measuring and analyzing population size, geographic distribution, composition (age, sex, race, marital status) and population dynamics (natality, marriage and divorce, mortality, reproductivity, and migration). The decennial census. Basic demographic rates, including crude and refined rates. General methods (standardization, cohort analysis, interpolation, and graphics). Nature and use of life tables. Introduction to population estimates and forecasts. *Prerequisite:* An elementary course in statistics and one or more courses in the social sciences.

**449. Population Statistics II: Intermediate Methods and Applications**

Spring, 3 credits

MARGARET J. HAGOOD

Continuation of Population Statistics I with more advanced techniques and specialized topics. Methods of measuring and adjusting for incompleteness, biases, noncomparability and other inadequacies of basic data. Construction of life tables. Measures of mortality, reproduction, and migration based on life tables. Intrinsic rates of increase; stable population. Application of life tables in population estimates and forecasts. Specialized estimates and projections (families, labor force). Methods of computing approximate or substitute rates. Methods of analyzing population composition and dynamics in relation to other factors. Practical applications of methods in social and economic research, market research, and government planning. *Prerequisite:* Population Statistics I.

**[700.] Population Statistics III: Advanced Analytical Methods (1951-52 and alternate years)**

MARGARET J. HAGOOD

**[702.] Population Research (1951-52 and alternate years)**

IRENE B. TAEUBER

**515. Sociology and Psychology of Group and Community Relations**

Fall, 3 credits

DOUGLAS ENSMINGER and CARL C. TAYLOR

A study of community organization and action, of group processes and functions, with special reference to problems which confront agricultural extension workers, health, welfare and church leaders, and general farm organizations; a study of leadership as a function of group formation and action, with special reference to group dynamics. *Prerequisite:* Approval of instructor.



## 516. The Cultural Regions of the United States

Spring, 3 credits

CARL C. TAYLOR and ARTHUR F. RAPER

A study of the cultural regions of the United States, covering in detail the characteristics of the various regions and subregions and their interrelationships, including settlement patterns, social organizations and institutions, prevailing ideologies, mores and folkways, and dominant attitudes and opinions of the people who live in the rural areas of these cultural regions. *Prerequisite:* Two courses in the social sciences.

## 718. Rural Social Problems and Policies

Fall, 2 credits (alternate years)

Staff of the Division of Farm Population and Rural Life (BAE)

Seeks to delineate the scope of rural social policy, demark social policy from farm production and price policy and analyze relationships between the two. Deals with such broad issues as the influence of population changes on economic and social problems and with such specific issues as the extension of social security and other types of social legislation to farmers and farm laborers, problems of tenure, housing, health and educational facilities. The conception of the course is that there are important social aspects of all agricultural policies and in addition that there are present or emergent national social policies which will and should encompass the rural as well as urban sectors of American society. *Prerequisite:* Approval of the Registrar.

## 055. Point 4 and Contemporary National Cultures

Fall and Spring (non-credit)

M. L. WILSON and FOSTER F. ELLIOTT

A seminar designed to define different national cultures and to discuss how such knowledge is basic to effective bilateral and multilateral cooperation, with special attention to underdeveloped areas. The seminar is related to a lecture series (special lecture announcements will be issued) under the same title; visiting lecturers lead some discussions. Other sessions use the case method in analysis and discussion of current problems of program planning and administration, particularly in the technical assistance program.

Attendance at the seminar is by invitation and is limited to persons involved in program planning, policy making and administration of governmental and private programs. Registration is not required and no fees are charged.

## HISTORY AND INTERNATIONAL RELATIONS

### COMMITTEE ON INTERNATIONAL POLICIES AND PROBLEMS

H. DUNCAN HALL (Chairman)

JORGE BASADRE  
STANLEY K. HORNBECK  
NELSON T. JOHNSON  
WALTER KOTSCHNIG  
HAROLD LASSWELL

GEORGE L. RIDGEWAY  
LEWIS H. ROHRBAUGH  
FRED J. ROSSITER  
CLAYTON E. WHIPPLE  
FRANCIS O. WILCOX

Today it is essential that the citizen keep abreast of the wide range of the relations that exist between his country and other countries, between his people and other peoples, and the new conditions that govern those relations. Two world wars, having immediate causes in areas and among peoples remote from the ordinary occupations and tensions of American life, definitely and perhaps irretrievably have involved the United States in world affairs and relationships far beyond any experience in its past.

On the political side, world power has shown the tendency to become more or less polarized between two Great Powers, the United States and the Union of Soviet Socialist Republics. Profound changes, of which the results cannot be foreseen, are taking place in the political alignments of many nations. Cultural interests, economic relations, and political security are all being changed and reshaped. New technical advances are part of the driving forces making for change. New techniques in the handling of foreign relations are being developed. Beside old methods of bilateral negotiation for the settling of international problems, the machinery of the United Nations, designed to deal with a wide range of world conditions, has been established.

Security, spiritual, material, and political, was at the very foundation and purpose of government and human social organizations from the time nations took form up to our own times. But the conditions of security are changing. The notion of security as something bounded by physical frontiers is perhaps changing most of all. Ideas spread from mind to mind throughout the free world; and, at least on a one way basis, between the free and the closed world. The instruments of mass communication, like the radio, impose on governments new problems of public relations in the international sphere. One result has been the setting up of a new section of the State Department to deal with such matters as public opinion at home and abroad, broadcasting and films, and other aspects of cultural relations between peoples.

Public lectures and courses in this area are designed to give the student some opportunity for (1) acquainting himself with the new techniques and approaches to international relations; (2) acquiring insight into basic materials, causal factors and historical backgrounds that determine the main current trends in international relations; and (3) getting a deeper knowledge of some of the main world problems and their impact on particular regions and countries.

## **250. American History to 1865**

Fall, 3 credits

WAYNE D. RASMUSSEN

A survey of the political, social, economic, and cultural forces, prior to 1865, which have contributed to the development of American civilization. Includes a summary of the colonial period; the political, economic, and diplomatic factors of the American Revolution; and the development of national life and institutions.

## **251. American History since 1865**

Spring, 3 credits

WAYNE D. RASMUSSEN

A survey of the political, social, economic, and cultural forces which, since 1865, have contributed to the development of present-day American civilization. Includes the frontier movement and immigration; constitutional growth and changes in world relations; and economic change and development.

**341. American National Government** (See p. 67)

**465. Views of Man and Society in the American Tradition**  
(See p. 95)

**428. Current Problems of World Politics**

Summer, 2 credits

PETER BERGER

Structure of state system; nationality; sovereignty as the maximum area of agreement. "We the peoples of the United Nations." Conditions of peace and causes of war (conflicts of will, interests and ideas; desires for things incompatible with peace; political, economic and ideological aggressions; insecurity, etc.). State and private struggle for power on the economic plane. Raw materials, population, agriculture and food. Diplomacy; military organization; ideological manipulations (political and psychological warfare by use of channels of communications, such as speech, press, radio, etc.); attempts to maintain peace and reasons for failure. Facilitating international cooperation, political, economic, cultural; and mitigating conflict by means of international institutions, public and private.

**407. History of Agricultural Policy in the United States**  
(See p. 91)

**434. Basic Factors in the Relations Between Nations**

Fall, 2 credits

H. M. SPITZER

Political thinking is apt to operate with concepts that are two or three generations out of date. In the study of international relations the state is treated usually as a rather constant and unvarying basic concept. In reality its character has changed greatly and continues to change.

This course discusses some of these changes, their causes and the ways in which they have created new international problems and modified old ones. Among the factors discussed are: growth of national civil services; effects of medical science on the size and quality of populations and on the suitability of regions for human settlement; changing influence of physical and mental diseases; effects of the spread of popular education; changing character and importance of public opinion; intensification of human contacts; greater speed and volume of communications; and influence of fashion, and the repercussions of modern technology. *Prerequisite:* Training in one of the social sciences or equivalent experience approved by instructor.

**[525.] The Application of Psychoanalytic Theory and Methods to Problems of International Relations (1951-52 and alternate years)**

H. M. SPITZER

**[745.] The United Nations: Organization and Functions in Relation to American Policies**

HOWARD B. CALDERWOOD

**[816.] World Communications and Transport**

WILLIAM VAN ROYEN and SPECIAL LECTURERS

**[817.] The Policies and Inter-Relations of the Great Powers—U.S.A., British Commonwealth and U.S.S.R.**

H. DUNCAN HALL and OTHERS

**820. American Foreign Relations, Policies and Practices**

Spring, 3 credits

NELSON TRUSLER JOHNSON

Fundamental principles as developed in the conduct of our foreign relations from the Declaration of Independence up to the close of the free immigration period in 1925; significant subsequent developments through and following World War II, requiring us to accept and meet the responsibilities which go with our position among the nations.

United States Government organization for conducting its business with other governments. Factors which have played major roles in the development of foreign policy: commerce, international finance, shipping, fishing, agriculture, etc.; public opinion and the influence of media of mass communication; minority and pressure groups; etc. Implementation of foreign policy in peace and war, choice of people and machinery; informing other peoples about ourselves and how best to accomplish it. Need for effective coordination of our governmental machinery so as to identify and harmonize the needs and convictions of the whole American people in a united common action for the achievement of their ideals. Present methods of coordination. Other possible methods, including the Secretariat system. *Prerequisite:* Graduate study in the social sciences, or responsible administrative or supervisory experience, or approval of instructor.

**430. Modern Russia**

Fall, 2 credits

VALERY J. TERESHTENKO

An overall survey of the USSR and its political, social and economic systems with major emphasis on the present situation rather than the past. Soviet ethnography and psychological characteristics of the Soviet people. Organization of the Soviet State and government; the Constitution. The Five Year Plans. Collective agriculture. Industrial, financial and trade systems. Cooperatives, trade unions, social insurance, system of medical care. Educational system.

**TRANSPORTATION AND COMMUNICATIONS**

## COMMITTEE ON TRANSPORTATION AND COMMUNICATIONS

DONALD E. CHURCH (Chairman)

RUSSELL B. ADAMS  
WILLIAM C. CROW  
FORD EDWARDS

WALTER B. EMERY  
MYLES E. ROBINSON  
J. C. WINTER

The economic and social life of nations is directly affected by the availability, cost and quality of transportation and communications service. Transportation service is not only important to individual enterprises as a link in the process of obtaining supplies and reaching markets, but the type of economic activity of an area is dependent upon transportation. For example, specialized production areas and large markets could not exist without transportation. As an industry, transportation ranks among the largest in the nation; about 60 billion dollars are invested in transportation plant and equipment and over two million persons are employed by the industry.

The public interest in transportation is so vital that, about sixty years ago, railroad transportation was put under government regulation which has more recently been extended to motor, air and water carriers. The extent of regulation differs among the types



of carriers and among the various state and federal agencies having regulatory responsibilities. Regulatory policies not only affect transportation agencies themselves but also create far-reaching influences throughout the economic system. Similarly, public interest has necessitated extensive control in the field of communications.

The courses offered in this field are designed to meet the specific needs of several types of students. Survey of Transportation is offered for persons working in other fields who wish to obtain a general understanding of transportation, and for persons who need a background for advanced work in this field. Regulation of Communications is a similar course in its field.

Two courses will be useful to persons who need a better understanding of transportation rates and efficient traffic management from the shipper point of view. For persons primarily interested in rates and rate structures, Transportation Rates and Rate Determination is suggested; while Traffic Management is recommended for persons who are primarily interested in the general phases of traffic management. Commercial Air Transportation is offered for persons who wish to obtain a comprehensive knowledge of this rapidly expanding industry. Transportation Research—Materials and Techniques is offered for persons who are engaged in transportation research or must rely upon findings made by others. It stresses ways to determine what information is available, interpretation, and guide-posts to detect and minimize misinterpretation.

Current Economic Problems in Transportation deals intensively with a few of the more pressing problems, and appraises the relative merits of various possible means to remedy them. This course is aimed to meet the needs of persons who have had extensive training or experience in economic analysis and who have a general knowledge of transportation.

### **345. Survey of Transportation**

Fall, 2 credits

DONALD E. CHURCH

A survey of transportation, types of carriers, and regulatory agencies. Deals briefly with the historical development of transportation and the relationship between transportation rates and the location of production and marketing centers; emphasis is placed upon regulatory policies and practices of the various agencies, cost and service characteristics of the various forms of transportation, establishment of rates and rate levels, and inter-carrier competition.

### **461. Transportation Rates and Rate Determination**

Fall, 2 credits

ABBEFORD S. DOLCH

The course is designed to give the basis for a general understanding of the use of traffic documents, commodity classifications, tariffs and traffic publications for the several forms of transportation, and a knowledge of rate principles and history of major rate adjustments.

**462. Traffic Management**

Spring, 2 credits

JAMES F. PERRIN

Designed to acquaint transportation students with the principles and practices of traffic management from both Governmental and commercial points of view. Emphasis on functions of a traffic department, both industrial and Governmental, and on relations between carriers and traffic departments, with a considerable portion of the emphasis placed on transportation law. *Prerequisite:* Transportation Rates, or experience with rates and tariffs, or permission of instructor.

**438. Commercial Air Transportation**

Fall, 3 credits (alternate years)

MYLES E. ROBINSON

A practical course in the organization, operation, and regulation of commercial air transportation. Both domestic and international phases will be covered, with primary emphasis on the former. The course will deal with the passenger, mail, express, and cargo activities of the air transport companies and will conclude with a survey of the extent and character of state and Federal regulation of the airline industry. *Prerequisite:* Principles of Economics, or equivalent as approved by instructor.

**510. Transportation Research—Materials and Techniques**

Spring, 2 credits

DONALD E. CHURCH

Designed primarily as a practical course for persons engaged in transportation research or using the findings of such research in connection with other activities; stress is placed upon the nature of research materials available and the analysis and interpretation of such materials. Among major phases are: (a) general principles involved in preliminary analysis of research problems as basis for selecting research materials; (b) use of reference guides and other devices to locate material; (c) analysis and interpretation of major transportation statistics and customary terminology; (d) ways to detect and avoid errors of interpretation; (e) selected methods for estimating factors not directly shown by existing information; (f) analysis and presentation of specific findings. *Prerequisite:* Knowledge of transportation and statistics, or permission of instructor.

**[605.] Communications in Society**

WALTER B. EMERY

**641. Current Economic Problems in Transportation**

Fall, 2 credits

FRANK L. BARTON and SPECIALISTS

The most important current economic problems are reviewed briefly to obtain a general understanding of the present situation; a limited number of problems are selected for intensive analysis. Each student selects or is assigned a special problem or phase of a broad problem for careful analysis. In general, the issues and proposed solutions for a selected pressing problem will be presented by one or more specialists drawn from carrier or shipper organizations, Government agencies, practitioners or others directly interested in the specific problem. Following the presentation of the various points of view, roundtable discussions will be held to appraise the issues and solutions. *Prerequisite:* Advanced study in transportation or responsible employment in related fields.

# Department of Technology

## DEPARTMENTAL COMMITTEE

F. J. SETTE (Chairman)

THOMAS B. CHAMBERS (Vice-chairman)  
LEOTA S. FINNEY  
R. G. HAINSWORTH  
H. E. HILTS

E. J. STOCKING  
E. J. UTZ  
EDGAR F. VANDIVERE  
MARSHALL S. WRIGHT

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Various departments and agencies of the Federal Government are engaged in extensive programs designed to conserve the Nation's natural resources and to raise the standards of living of urban and rural populations. These programs include such projects as flood control, soil conservation, power development, mapping, rural electrification, industrial hygiene, housing, and a large number of related activities. All these projects involve in varying degrees engineering techniques and professional engineers, and include many functions requiring that this personnel have an intimate, working knowledge of techniques not provided in the standard engineering and related technological courses.

Basically, education in engineering schools is limited by necessity and tradition to a period of four or five years. This short period of training provides sufficient time to assimilate and master only a minimum of the basic sciences. There is little time available for courses which will give the technical student an understanding of the social and economic problems of the world about him. As a result, he fails often to appreciate the impact upon society of the advances of his profession. Moreover, technological techniques and practices are never static and developments in the sciences and in engineering require enlarging and constant reorienting of the engineer's technical background.

Mindful of the limitations of engineering education, of the engineer's place in modern society, and of the need for providing opportunity for additional study, the Graduate School, working with representatives of the various Government departments and agencies and of the local chapters of engineering societies, offers courses designed to add to the technical, administrative and professional background of engineers in the service of the Federal Government. Many courses offered also give an intimate working knowledge of the latest techniques that colleges and technical institutes often cannot provide.

The Department of Technology offers a number of courses in those skills, basic to engineering operations, which will be of as-

sistance to the engineer, the applied scientist, and the non-engineer desiring to broaden his background, to increase his efficiency, and to develop his professional capacity.

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*Course Numbers and Symbols*—Below 100, non-credit; 100–399, undergraduate; 400–699, graduate and advanced undergraduate (senior); above 699, graduate. Bracketed numbers, not given this year.

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## DIVISION OF ENGINEERING

### COMMITTEE ON ENGINEERING

THOMAS B. CHAMBERS (Chairman)

J. A. C. CALLAN

J. H. GEHRING

RICHARD HAMERSTROM

FERDINAND KAUFHOLZ

HARRY SAWCHUCK

J. P. SCHAEZNER

F. F. SNYDER

E. J. UTZ

JOHN A. WEBER

## 110. Principles of Electricity

Fall, 2 credits

DAVID ASKEGAARD

Principles of electricity, emphasizing alternating currents. Covers basic units such as voltage, current and power and their measurement, resistance, voltage regulation, line loss, power factor, three phase systems, etc. The function of equipment used on rural electric distribution systems such as generators, substations, transformers, lightning arrestors, fuses, oil circuit reclosers, etc., will be emphasized.

## 402. Principles and Practice of Refrigeration

Fall, 2 credits (alternate years)

HARRY L. GARVER

Includes a study of: types of mechanical equipment, power, controls, evaporators, condensers, insulation and heat transfer, characteristics of refrigerants and eutectic solutions; refrigeration requirements for different foods; management of storages; and refrigerated transportation. *Prerequisite*: Physics, algebra, trigonometry, and analytic geometry.

## 501. Transmission and Distribution Systems for Area Electrification

Fall, 3 credits

EDWARD P. EARDLEY

Study of electrical and mechanical characteristics of lines used in the transmission and distribution of power; the operation of such systems; the economic principles on which design rests. *Prerequisite*: Degree in engineering or equivalent experience.



**702. Electric Utility Engineering**

Year, 2 credits each semester (alternate years)

J. J. A. JESSEL and ALMON D. THOMAS

Fundamentals of electric utility engineering and their practical application to generating, transmitting, and distributing electric energy by electric utilities. Designed for engineers, engineering aids, lawyers, accountants and others who desire a broader understanding of the basic principles of electric utility engineering as applied to operating electric utilities. Subjects covered are: a general description of production, transmission, and distribution plants of electric utility, including each of the units of the property and an explanation of its functions; lectures and case studies in design and operation of electric generating stations, transmission lines and substations, and distribution substations, feeders, transformers, and services; discussions of practices followed by electric utilities in serving different classes of customers. *Prerequisite:* College degree or equivalent experience.

**515. Steam-Electric Generating Plant Design**

Fall, 2 credits

To be announced

A review of the principles and practices basic to the design and operation of modern steam-electric generating plants, intended primarily for use of graduate engineers. *Prerequisite:* Degree in engineering or equivalent experience, or consent of instructor.

**560. Fundamentals of Telephony**

Fall, 2 credits

FREDERICK H. NOLKE

An introduction to the principles of telephony with special emphasis on rural telephone systems. Covers basic telephone transmission theory, central office switching methods, central office auxiliary equipment, fundamental circuit analysis, toll switching methods, rural carrier systems and outside plant practices. Special lectures will be given by engineers from industry and Government who are specialists in the various phases of the telephone field. *Prerequisite:* Degree in engineering or equivalent, or permission of instructor.

**[510.] Analysis of Statically Indeterminate Structures (1951–52 and alternate years)**

ALFRED W. FISCHER

**[520.] Theory and Design of Welded Structures (1951–52 and alternate years)**

NATHAN W. MORGAN

**542. Mechanical Vibrations**

Year, 2 credits each semester (alternate years)

ALBERT LONDON

Background mathematics. Harmonic oscillator. Free and forced vibration. Electric circuit analogies. Vibration pickups. Vibration isolation. Normal modes. General laws. Reciprocity principle. The Lagrangian. Rayleigh-Ritz method. Strings. Bars. Membranes. Plates. Critical speeds. Stability. Non-linear systems. *Prerequisite:* Calculus and Mechanics.

**700. Analysis of Rigid Frames**

Year, 2 credits each semester (alternate years)

A. AMIRIKIAN

The first semester covers the fundamentals of slope-deflection and the analysis of continuous beams and rectangular frames. Subjects will include: curvature; deflection angle; deflection; conjugate beam; sign convention; fixed-end moments; slope deflection; frames without sway—direct method of solution, solution of approximations; frames involving sway—rectangular bents.

The second semester covers the analysis of complex frames of various outline, secondary stresses, and semirigid framing. Subjects will include: trapezoidal bents; vierendeel bents; gable bents; lean-to bents; hip bents; bents of irregular outline; secondary stresses; semirigid framing. *Prerequisite:* One of the following: degree in civil engineering; several years of structural design experience; experience required for engineer, GS-7.

### 310. Aerodynamics

Year, 2 credits each semester

MAURICE E. LONG

First semester: Fluid flow, wing theory, airfoil characteristics, wind-tunnel tests, stability, drag data. Lectures, discussions, and problems.

Second semester: Engine and propeller considerations, performance calculations, special problems. *Prerequisite:* College physics, algebra, trigonometry, and analytic geometry.

### 301. Soil Mechanics

Year, 3 credits each semester

EDWARD S. BARBER

Theory and practical applications of soil mechanics to the engineering problems of foundations, dams and embankments. Course designed to familiarize general engineers with problems connected with soils and methods of foundation investigation and laboratory tests available for solving these problems. Foundation investigation methods described include: core drilling, auger boring, test pit digging, record keeping and collection and protection of samples. Laboratory tests to be described include: general classification, permeability, consolidation, compaction, shear and triaxial compression. Laboratory facilities are available for demonstration. *Prerequisite:* Degree in engineering.

### [552.] Recent Developments in Materials Engineering (1951-52 and alternate years)

DANIEL KLATZKO, WILEY C. SMITH and COMMODITY EXPERTS

### [553.] Engineering in Materials Supply Operations

WILLIS S. MACLEOD

### [554.] Protecting Engineering and Scientific Developments Through Patents (1951-52 and alternate years)

ALBERT J. KRAMER

## DIVISION OF SURVEYING AND MAPPING

### COMMITTEE ON SURVEYING AND MAPPING

MARSHALL S. WRIGHT (Chairman)

WARREN C. CRUMP  
GEORGE H. EVERETT  
W. S. HIGGINSON  
J. E. KING  
GUILLERMO MEDINA  
ALBERT L. NOWICKI

HOWARD S. RAPPLEYE  
A. L. SHALOWITZ  
G. C. TEWINKEL  
PAUL D. THOMAS  
H. W. WHITLOCK  
ARCHER M. WILSON

Maps have played an important part in human progress. Today, as never before, they furnish the basis for both military and non-military activities throughout the world. Greater use of maps

has brought increasing demand for persons qualified in each of the technical phases of map production and reproduction.

The purpose of the curriculum in surveying and mapping is to offer basic training for those persons who are engaged in the technical and supervisory aspects of map making. The curriculum is intended to give the student a broad knowledge and basic understanding of each of the separate phases of the science; to enable him to understand better the problems, possibilities, and limitations of each of the phases. He can then better plan his own activities toward the economical production of accurate maps. A large part of the curriculum is devoted to geodesy, a subject considered to be of increasing importance in view of modern rapid means of world-wide travel, the consequent need for world-wide charts, and the development of new methods in surveying.

At least two years' work toward a degree of Bachelor of Science in Civil Engineering is considered as being the logical background for the curriculum in surveying and mapping, although one who has completed the sophomore year in engineering normally would have fulfilled the usual prerequisites. Many other potential students will also find that they may have already fulfilled all or nearly all the prerequisite studies. It should be emphasized that Calculus and College Physics are desirable prerequisites for advanced courses. Persons who are planning a career in this field are urged to arrange their schedules so as to include these courses at the earliest opportunity.

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## 215. Route Surveying

Fall, 3 credits (every third year) HOWARD S. RAPPLEYE and ERNEST J. PARKIN

Theory and practice of surveying for railroads, highways, canals; preliminary and location surveys, cross sections, earthwork quantities and transition spirals. Lectures, classroom work and field work. *Prerequisite:* Elementary surveying and plane trigonometry.

## 216. Ground Methods of Topographic Surveying

Spring, 3 credits (every third year)

HOWARD S. RAPPLEYE and ERNEST J. PARKIN

Transit and stadia; plane table and stadia; approximate methods, special methods for peculiar conditions; Beaman stadia arc; Baldwin solar chart, etc. Lectures, classroom work and field work. *Prerequisite:* Elementary surveying and plane trigonometry.

[217.] **Astronomy for Engineers** (1951-52 and every third year)

HOWARD S. RAPPLEYE and ERNEST J. PARKIN

[218.] **Geodetic Surveying** (1952-53 and every third year)

HOWARD S. RAPPLEYE and ERNEST J. PARKIN

**[219.] Computation and Adjustment of Geodetic Observations (1952-53 and every third year)**

HOWARD S. RAPPELVEY and ERNEST J. PARKIN

**120. Introduction to Photogrammetry**

Fall, 2 credits

ARTHUR H. FAULDS

Lectures and demonstrations in non-technical terms cover: the history and development of photogrammetric engineering; the importance of optics; basic principles of photography; types of aerial photography, aerial cameras, accessory equipment, and photographic aircraft; requirements of coverage, flight lines, tilt, and scale; photo interpretation and stereoscopes; requirements of horizontal and vertical control; radial plot and stereoscopic plotting instruments. Designed for persons who use aerial photographs in military planning and operations, highway development, agricultural land use and conservation, mineral and petroleum exploration, and in other engineering and industrial operations.

**212. Photogrammetry I**

Fall, 2 credits

W. S. HIGGINSON

Basic optics; basic geometric characteristics of aerial photographs; flight planning; basic photography and laboratory practices; photographic materials; aerial cameras; camera mounts. *Prerequisite:* College plane trigonometry.

**213. Photogrammetry II**

Spring, 2 credits

W. S. HIGGINSON

Radial line plotting methods, mosaics, determination of elevations from photographs, photo-interpretation. *Prerequisite:* Photogrammetry I.

**[370.] Photogrammetry III (1951-52 and alternate years)**

G. C. TEWINKEL and BERNARD J. COLNER

**[371.] Photogrammetry IV (1951-52 and alternate years)**

G. C. TEWINKEL and BERNARD J. COLNER

**220. Aerial Photographic Interpretation**

Fall, 3 credits

ETHAN D. CHURCHILL

Principles, techniques and applications of aerial photographic interpretation; history, concepts, types of aerial photographs, principles, techniques, and applications. Study, and use in various fields, of aerial photographs as a source of detailed natural and cultural information. *Prerequisite:* A general background in one of the following fields: surveying and mapping, cartography, geography, geology, forestry, agriculture, architecture, or allied engineering fields.

**125. Introduction to Cartography**

Spring, 2 credits

STEPHEN M. JOHNSON

This course will introduce the student to the field of cartography and the problems that are involved in the compilation, production, and uses of maps. Subjects included are: history of maps; the geographic framework of maps; the significance of map scale; descriptions of the various methods of mapping; reading the map content; map programs of the various Federal agencies; map research problems; and general extent of mapping throughout the world.



**222. Cartography I—Technical Elements**

Fall, 2 credits

GEORGE H. EVERETT

An introduction to the technical problems of cartography. Study in the use of distance and direction elements as they define relative location; shapes of features and areas in maps, as they are used in evaluating various map projections; the reference coordinate systems for expressing relative location; the use of geodetic surveys; the methods and limitations of coverage of various types of surveys; and the evaluation and necessary supplementation of the surveys in the assembly of data for map compilations. *Prerequisite:* College plane trigonometry.

**223. Cartography II—Map Projections and Grid Systems**

Spring, 2 credits

EDWARD W. FONFARA

Includes: basic principles with practical applications; computations; use of tables; layout; definitions; classifications; and characteristics. Identification of such standard projections as the polyconic, mercator, transverse mercator, Lambert conformal, gnomonic, and stereographic; and coordinate systems including rectangular, broad-area and true military grid.

This subject is presented from the practical viewpoint without the complex variable theory applications. *Prerequisite:* College plane trigonometry.

**[224.] Cartography III—Large Scale Maps (1951–52 and alternate years)**

JACOB SKOP

**[225.] Cartography IV—Small Scale Maps (1951–52 and alternate years)****240. Methods of Map Reproduction**

Spring, 2 credits

M. S. A. DELANEY and SPECIALISTS

Photography including wet plate, dry plate and film; photostat, ozalid, blueprint, etc.; process plate making including plastics; negative engraving and lithographic drafting; transferring; type composition for maps; copper plate engraving and plate printing; presswork, single and multicolor; layout and film assembly; inks and papers; binding and finishing. Lectures by lithographic experts from government and industry.

**430. Theory of Map Projections**

Fall, 2 credits (alternate years)

JOHN A. O'KEEFE

Clarification, choice and properties of map projections; the application of the theory of map projections for determining the basic relations that will produce a projection of desired properties; technique of computing a special projection table; technique of constructing projections; great circles and rhumb lines; the mercator, gnomonic, polyconic, Lambert conformal, stereographic and other projections in common use; military, domestic and foreign grid systems. *Prerequisite:* Calculus.

**[440.] Theory of Geodesy (1951–52 and alternate years)**

PAUL D. THOMAS

## DIVISION OF FINE ARTS AND ARCHITECTURE

**322. Survey of Art**

Fall, 2 credits

CHARLES M. RICHARDS

The course is designed to establish the basic values which underlie artistic achievement and to develop an appreciation of these values before the objects themselves. From age to age these basic values—the aesthetic values—remain the same. The lectures will attempt to relate the major epochs to one another so as to indicate the continuity of art history and at the same time contrast the variant forces and ideas which produced such differing styles and expressions.

**334. Modern Painting**

Spring, 2 credits

CHARLES M. RICHARDS

This course begins with a study of the art of the outstanding masters of the 17th Century and of the general current of painting in that century, with emphasis on the development of painting through the National Schools and styles up to the present moment. The main concern will be to arrive at an understanding and appreciation of impressionism and post-impressionism.

**321. Pencil Sketching and Freehand Drawing**

Fall, 2 credits. Repeated in Spring and Summer

WALTER G. CADMUS, JR.  
ROWLAND LYON

Study of shade, shadows, and perspective. An intensive study of theory, harmony of lines, and pictorial and outdoor sketching. Each student receives individual criticism. Open to both beginners and advanced students.

**323. Portrait Painting in Oil**

Fall, 2 credits. Repeated in Spring and Summer

PIETRO LAZZARI

To enjoy this course the student need not have experience as an artist but must have the desire to achieve proficiency in portraiture.

Professional methods of painting oil portraits incorporating the basic techniques of the old masters and the spirit of modern art. Course includes, sketching, line composition and light arrangement; color, theory and technique of painting in oil. All work done from life.

**320. Water Color Painting**

Fall, 2 credits. Repeated in Spring

ROWLAND LYON

Theory and practice; painting from landscape and still life.

**230. Interior Decoration—I**

Fall, 1 credit. Repeated in Spring

MARTHA L. HENSLEY

Principles of color, line and design; choice and use of accessories; planning draperies and slipcovers; selection of rugs. Fabrics, photographs and diagrams used to supplement lectures.

**231. Interior Decoration—II**

Fall, 1 credit. Repeated in Spring

MARTHA L. HENSLEY

Study of period and contemporary furniture and its adaptability to modern living. Particular attention will be given to general characteristics of each period including: decoration, color, floor coverings, upholstery and drapery fabrics, and accessories. Lectures illustrated.

### 316. Landscape Design—Small Property

Fall, 2 credits

JOSEPH C. GARDNER

The purpose of this course is to encourage and direct the creative impulse of the person interested in the landscape development of the small property, thus creating more interest and pleasure in the home. The course will include an outline of the basic principles of land planning and their application to the design of the small property, with discussion of the principles of composition in relation to the selection and use of plants and other materials. The practical application of landscape design principles to specific problems. A discussion of the physical aspects of landscape development including construction methods, horticultural standards and maintenance requirements. Each member of the class will be required to submit a statement concerning his program for the plan and development of his property or property of his selection.

### 324. Basic Mechanical Drawing I

Fall, 2 credits

LEO G. D. WIEMER

The use of drawing instruments. Lettering and dimensioning. Problems in conventional presentation of objects by means of lines, including geometrical problems, orthographic projection and auxiliary projection. One hour lecture and three hours drafting room work each week.

### 325. Basic Mechanical Drawing II

Spring, 2 credits

LEO G. D. WIEMER

Advanced instruction in the elements taught in Basic Mechanical Drawing I. Developments and intersections. One hour lecture and three hours drafting room work each week. *Prerequisite:* Basic Mechanical Drawing I or equivalent.

### 340. Architectural Drafting I

Fall, 2 credits

LEO G. D. WIEMER

Frame house construction. Study of wood framing and related building materials; arrangement of rooms and furniture; the economy of good construction. Drawing of plans and elevations of a frame residence from sketches. One hour lecture and discussion and three hours drafting room work each week. *Prerequisite:* Basic Mechanical Drawing II or equivalent.

### 341. Architectural Drafting II

Spring, 2 credits

LEO G. D. WIEMER

Large scale drawing of exterior and interior details for the frame residence studied in Architectural Drafting I. One hour lecture and discussion and three hours drafting room work each week. *Prerequisite:* Architectural Drafting I or equivalent.

### 342. Architectural Drafting III

Fall, 2 credits

LEO G. D. WIEMER

Study of masonry construction and related building materials. Site plan study and drawing. Preparation of plans and elevations of a masonry building from sketches. One hour lecture and discussion and three hours drafting room work each week. *Prerequisite:* Architectural Drafting II or equivalent.

### 343. Architectural Drafting IV

Spring, 2 credits

LEO G. D. WIEMER

Large scale drawing of exterior and interior details for the masonry building studied in Architectural Drafting III. Outline study of the Orders of Architecture. One hour lecture and discussion and three hours drafting room work each week. *Prerequisite:* Architectural Drafting III or equivalent.

### 305. Elements of Statistical Drafting

Year, 2 credits each semester

NELSON P. GUIDRY

A practical course in drafting involving actual preparation of statistical maps and charts in class. Explanations of short cut methods of lettering technique and arrangement of component parts of illustrations. Complete illustrations will be prepared in ink ready for publication. The reduction, reproduction, and color application to statistical maps and charts will be explained.

## DIVISION OF TECHNICAL ARTS

### COMMITTEE ON TECHNICAL ARTS

R. G. HAINSWORTH (Chairman)

SADYE F. ADELSON  
EDWARD S. COBB  
KENNETH M. GAPEN

DOROTHY NICKERSON  
ELBRIDGE C. PURDY  
MARY A. ROKAHR

### 188. Glass Blowing

Year, 2 credits each semester

L. B. CLARK, SR.  
L. B. CLARK, JR.

A laboratory course for technicians. Simple manipulation of joining, bending, and shaping is carried through to the production of useful apparatus. Metal in glass and glass to metal seals of all types are made. During the first semester the soft glasses are utilized for practice; during the second semester the related glasses are used. Ample opportunity for advanced work is given those who show themselves particularly adapted to the work. (New students may be admitted in the Spring if space permits.)

### 329. Home Gardening

Spring, 2 credits

WILBUR H. YOUNGMAN

A lecture and discussion course in the fundamentals of gardening for the amateur. Beginning with a discussion of design, the course briefly covers the preparation of soil, selection of plant materials, planting, cultural practices, protection from insects and diseases and pruning and propagation of shrubs for the home garden. The home production of vegetables and fruits will be discussed briefly with emphasis on culture under Washington conditions.

### [261.] Color Technology—Psychological Aspects (1951–52 and alternate years)

JOSEPHINE G. BRENNAN

### [262.] Color Technology—Physical Aspects (1951–52 and alternate years)

### 234. Modern Homemaking for Employed Men and Women

Fall, 2 credits

SADYE ADELSON and SPECIALISTS

Specialists, in a series of popular lectures, will give up-to-the-minute practical information on homemaking for the busy family. Topics covered will include: family financial planning; menu planning; buying food; selecting the home; functional house planning; selecting and arranging home furnishings; selecting and storing household equipment; managing the work in the home; selecting clothing to suit pocketbook, wearer, and function; care of clothing; family cooperation; and child guidance.



## COMMITTEE ON PHOTOGRAPHY

R. G. HAINSWORTH (Chairman)

EDWARD S. COBB  
 RAYMOND DAVIS  
 WILLIAM J. FORSYTHE  
 R. J. LEFEBVRE

KEITH B. LEWIS  
 ALBERT R. MATERAZZI  
 HOWLAND PIKE  
 ELBRIDGE C. PURDY

ROY M. REEVE

**70. Popular Photography**

Fall, non-credit. Repeated in Spring and Summer ALBERT W. MATTHEWS

This is a lecture, demonstration course of a non-technical nature. It is intended particularly for those camera enthusiasts who desire a clearer understanding of how their cameras, films and prints work. Better pictures should be the result of taking this course. Topics covered: camera types and operation; film types and uses; developing and printing; filters; exposure; planning, composition and lighting; portraiture; motion pictures; color photography. Exhibition and demonstration of equipment, materials and techniques supplement class lectures and discussion.

**130. Art in Photography I**

Fall, 2 credits

RICHARD C. BALL

Demonstration of various pictorial factors such as mass, line, form, contour, space, tone, and perspective. Training the student to recognize and use these compositional factors as aids in making more effective pictures. *Prerequisite:* Popular Photography or equivalent as approved by instructor.

**131. Art in Photography II**

Spring, 2 credits

RICHARD C. BALL

Includes: structure of the head and body as applied to portraiture; color composition; movement and animation; lighting mood and tempo; and critiques on all class projects. Student projects will be assigned to achieve maximum pictorial effect by selective compositional arrangement. *Prerequisite:* Art in Photography I.

**192. Fundamentals of Photography I**

Fall, 2 credits. Repeated in Spring

ROBERT A. KOCH

This course forms a foundation for all of the other courses in photography. It offers a thorough grounding in elementary optics, physics, chemistry and composition as related to basic photographic operations. Topics covered: lenses, their make-up and function; characteristics of negative emulsions and printing papers; methods of correct exposure; the theory of development; fixing and washing processes; fundamental concepts of composition; and principles and uses of filters.

**193. Practice of Photography I**

Fall, 2 credits. Repeated in Spring

JAMES A. BEALES

This course furnishes laboratory practice and demonstration of the principles taught in Fundamentals of Photography I. It offers the student an opportunity to become familiar with recommended procedures and techniques. Topics covered: contact printing and processing; selection of printing papers; processing of negative roll film, cut film and film pack; diagnosis and remedy of processing defects; types of cameras, their operation and uses, and the application of filters. This course may be taken concurrently with Fundamentals of Photography I. *Prerequisite:* Fundamentals of Photography I.

**194. Fundamentals of Photography II**

Spring, 2 credits

EDWARD S. COBB

A continuation of Fundamentals of Photography I. Subjects included are: practical sensitometry and gradation control; the theory of projection printing; line and mass in picture arrangement; the nature of photographic light, its characteristics, control and measurement; shutter types and their performance; chemistry of photographic processes and the use of color film. *Prerequisite:* Fundamentals of Photography I.

**195. Practice of Photography II**

Spring, 2 credits

JAMES A. BEALES

A continuation of Practice of Photography I. Subjects included are: application of sensitometric measurements, projection printing, print correction, composite printing, lighting, rendition of form and texture, light patterns, principles of portraiture, the effect of light on color, retouching, toning and print analysis. *Prerequisite:* Practice of Photography I.

**270. Color Photography I—Camera Techniques**

Fall, 2 credits

HARVEY B. MOHR

Covers the general camera techniques of color photography and the use of current materials and equipment. Instruction in lighting, exposure, color balance and processing of monopack materials such as AnscoColor and Kodachrome; the use of the one-shot camera and the making and processing of direct color separations; practical masking methods for color transparencies and an introduction to color printing with the Printon Process. Lectures and supervised studio and laboratory demonstrations. *Prerequisite:* Fundamentals of Photography II and Practice of Photography II or equivalent in training and experience.

**271. Color Photography II—Printing Techniques**

Spring, 2 credits

HARVEY B. MOHR

Designed to cover in detail the Dye-Transfer and Printon method of color printing. Instruction and laboratory work in the production of separation negatives from transparencies; characteristics and processing of Printon; masking techniques; matrix film development; registration problems; dye balance control; and transfer technique. Lectures and supervised laboratory work. *Prerequisite:* Color Photography I.

[307.] **Advanced Color Photographic Theory** (1951–52 and every third year)

**360. Portrait Photography**

Year, 2 credits each semester

ELBRIDGE C. PURDY

A studio and darkroom course that provides opportunity for practice. The student learns through individual guidance the subtleties of fine portrait work. Lighting, posing, composition, processing and re-touching. *Prerequisite:* Practice of Photography II.

**011. Photographic Roundtable**

Year, non-credit

ELBRIDGE C. PURDY and OFFICERS

The Roundtable has been formed to provide opportunity for the continued study of photography. The group meets twice each month during the regular school year. One meeting is devoted to constructive analysis of photographic work presented by members; the other meeting is devoted to presentation of information about new developments and techniques in photography and to other topics of current interest. The Roundtable sponsors an Annual Salon.

Registration is open to persons who have completed any of the courses in photography offered by the Graduate School. No fee is charged; registration, however, is required.

# Faculty

## FACULTY, DEPARTMENTAL AND SPECIAL COMMITTEES, AND PUBLIC LECTURERS

\* Faculty    ‡ Special Committee    ° Special Public Lecturers  
† Departmental Committee or Sub-committee

- \*ABERDEEN, ESTHER J., Ph.D., Chicago. Geologist, Geologic Division, U. S. Geological Survey, Department of Interior. Taught in Chicago, Milwaukee-Downer, Northwestern and Wellesley. (Physical Sciences)
- \*ABRAHAMSEN, MARTIN A., Ph.D., Wisconsin. Principal Agricultural Economist, In Charge, Purchasing Section, Cooperative Research and Service Division, Farm Credit Administration, USDA. Taught in West Virginia and North Carolina State. (Social Sciences)
- \*ACKER, LAURENCE W., C.P.A. Director, Internal Audit Division, Office of Comptroller, General Services Administration. Taught in Tyler Commercial College. (Public Administration)
- ‡ACKERMAN, CLARA B., M.A., George Washington. Editor, Extension Service Review, Extension Service, USDA. (Committee on Information)
- \*ADAMS, EVA B., LL.B., American. Administrative Assistant to Senator McCarran of Nevada, U. S. Senate. Taught in Nevada. (Public Administration)
- †ADAMS, RUSSELL B., Member, Civil Aeronautics Board. (Social Sciences)
- ‡ADCOCK, ROBERT E., M.S., Oklahoma A. and M. Chief, Training Section, Office of Personnel Services, Production and Marketing Administration, USDA. Taught in Oklahoma A. and M. and Cameron State Agricultural College. (Committee on Correspondence Study and Extension Education)
- \*†ADELSON, SADYE F., M.A., California. Technical Assistant to the Chief, Bureau of Human Nutrition and Home Economics, Agricultural Research Administration, USDA. (Technology)
- \*†ALLIN, BUSHROD W., Ph.D., Wisconsin. Chairman, Outlook and Situation Board, Bureau of Agricultural Economics, USDA. Taught in Wisconsin. (Social Sciences)
- \*ALLSMAN, TEN M. F., Assistant Director, Office Methods Division, Administrative Office, Department of the Navy. (Office Techniques)
- \*AMIRIKIAN, A., C.E., Cornell. Head Designing Engineer, Bureau of Yards and Docks, Department of the Navy. Taught in Catholic and George Washington. (Technology)
- \*†ANDERSON, ELIN, M.A., Columbia. Specialist in Rural Health Services, Extension Service, USDA. Taught in Nebraska and Vermont. Author, "We Americans" and "Do We Want Public Health?" (Social Sciences)
- \*ANDERSON, LOUIS H., LL.B., Washington College of Law. Offset Composition Development Officer, Government Printing Office. (Languages and Literature)
- †APPELMAN, PAUL L., Examiner in Accounting, Administrative and Social Sciences Section, Examining Division, Civil Service Commission. (Public Administration)
- °APPLEBAUM, WILLIAM, A.B., Minnesota. Assistant General Manager, Stop and Shop, Inc. (Social Sciences)
- \*ARNOULD, JACK C., LL.M., University of Paris. Assistant to the Air Attaché, French Embassy. Taught in Georgetown. (Languages and Literature)
- †ASAY, IVAN, M.S., Syracuse. Chief, General Methods Branch, Division of Management Services, Office of the Surgeon General, Public Health Service, Federal Security Agency. Taught in Denver. (Public Administration)
- †ASBURY, NORMAN G., B.S., Gettysburg. Management Engineer, Department of the Navy. (Public Administration)
- \*ASKEGAARD, DAVID, E.E., North Dakota State. Assistant to Chief, Management Division, Rural Electrification Administration, USDA. (Technology)
- †AYLESWORTH, PHILLIP F., M.S., Purdue. Administrative Officer, Office of the Secretary, USDA. (Social Sciences)
- \*BACHMAN, KENNETH L., M.S., Harvard. Head, Farm Classification and Analysis Section, Division of Farm Management and Costs, Bureau of Agricultural Economics, USDA. (Social Sciences)
- †BAKER, GLADYS L., Ph.D., Chicago. Agricultural Historian, Bureau of Agricultural Economics, USDA. (Public Administration)
- \*BAKER, LYNN E., Ph.D., Wisconsin. Scientific Advisor, Human Resources Division, Department of the Air Force. Taught in Wisconsin. (Social Sciences)
- \*BALL, RICHARD C., Photographer, Service Operations Division, Office of Plant and Operations, USDA. (Technology)
- †BAMFORD, RONALD, Ph.D., Columbia. Associate Dean, College of Agriculture, University of Maryland. (Biological Sciences)

- \*BARBER, E. LLOYD, M.A., Clark. Agricultural Economist, Bureau of Agricultural Economics, USDA. Taught in Iowa State. (Social Sciences)
- \*BARBER, EDWARD S., C.E., Maryland. Associate Professor of Civil Engineering, University of Maryland. (Technology)
- \*BARCAN, ARTHUR, M.A., Columbia. Head, Reports Control Section, Office of Methods Division, Administrative Office, Department of the Navy. (Office Techniques)
- †BARTLETT, L. GEORGE, C.P.A., B.C.S., Southeastern. Reviewing Examiner, Examination Division, Farm Credit Administration, USDA. (Committee on Internal Audit)
- \*BARTON, FRANK L., M.B.A., Texas. Special Assistant, Office of the Secretary, Department of Commerce. (Social Sciences)
- †BASADRE, JORGE, D.Litt., San Marcos. Director, Department of Cultural Affairs, Pan American Union, Organization of American Republics. Taught in San Marcos. (Social Sciences)
- \*BAUER, MAGNA E., Auguste Victoria Lyzeum, Berlin. Historian Translator, Office of the Chief of Military History, Department of the Army. (Languages and Literature)
- \*BEACHAM, LOWRIE M., JR., B.S., South Carolina. Chief, Foods Branch, Division of Food, Food and Drug Administration, Federal Security Agency. Taught in South Carolina. (Physical Sciences)
- \*BEALES, JAMES A., Assistant Chief, OII-INP, Department of State. (Technology)
- †BEAR, N. ROBERT, B.S., Ohio State. Chief, Division of Organization and Personnel Management, Office of Personnel, USDA. Taught in Ohio State and Michigan. (Public Administration)
- \*†BEAUCHAMP, GEORGE E., Ph.D., Northwestern. Associate Director, Commission on Occupied Areas, American Council on Education. Taught in Manchester College, Northwestern, and Nottingham. (Languages and Literature)
- †BECKNELL, HARVEY E., M.A., Columbia. Chief, Office of Management Research, Bureau of Labor Statistics, Department of Labor. (Public Administration)
- \*BEEN, RICHARD O., M.A., George Washington. Economist, Division of Marketing and Transportation Research, Bureau of Agricultural Economics, USDA. (Mathematics and Statistics; Social Sciences)
- †BENNETT, R. D., Ph.D., Chicago. Technical Director, Naval Ordnance Laboratory, Department of the Navy. Taught in Union College and Massachusetts Institute of Technology. (Physical Sciences)
- †BENTON, MILDRED C., A.B., George Washington. Chief, Division of Field Library Services, Library, USDA. (Public Administration)
- †BERCAW, LOUISE O., Assistant Librarian, USDA. (Committee on Correspondence Study and Extension Education)
- \*BERGER, PETER, Ph.D., Vienna. Assistant Professor, Catholic. Taught in Loyola (Baltimore) and Georgetown. (Social Sciences)
- \*†BISHOPP, F. C., Ph.D., Ohio State. Assistant Chief, Bureau of Entomology and Plant Quarantine, Agricultural Research Administration, USDA. Taught in Colorado A. & M. and Maryland. (Biological Sciences)
- \*BLAKE, SIDNEY F., Ph.D., Harvard. Senior Botanist, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, USDA. Taught in Stanford. (Biological Sciences)
- †BLICKENSDEFER, J. P., Ph.D., Harvard. Editor, U. S. Quarterly Book List, Library of Congress. Taught in Oklahoma, Washington, Harvard and Pittsburgh. (Languages and Literature)
- \*BODDIE, JOHN B., Chief, International Services Section, Office of Business Economics, Department of Commerce. (Mathematics and Statistics)
- †BOGGS, S. W., M.S., Columbia. Special Adviser on Geography, Department of State. (Physical Sciences)
- \*BOTTS, RALPH R., B.S., Florida. Principal Agricultural Economist, Insurance Section, Division of Agricultural Finance, Bureau of Agricultural Economics, USDA. (Office Techniques; Public Administration; Social Sciences)
- \*BOWEN, C. VERNE, M.S., Washington and Jefferson. Chemist, Bureau of Entomology and Plant Quarantine, Agricultural Research Administration, USDA. Taught in Washington and Jefferson. (Physical Sciences)
- \*BRAUM, DANIEL M., B.S.A., Kansas State. Head Training Officer, General Services Administration. (Office Techniques)
- \*BRENNAN, JOSEPHINE G., M.A., Bryn Mawr. Taught in Bryn Mawr. (Technology)
- \*†BREWSTER, JOHN M., Ph.D., Columbia. Marketing Research Analyst, Fats and Oils Branch, Production and Marketing Administration, USDA. Taught in Columbia. (Social Sciences)
- \*BROWN, DAVID S., A.B., Maine. Assistant Executive Secretary, Central Secretariat, Economic Cooperation Administration. Taught in Syracuse. (Public Administration)
- \*BRUNK, MAX E., Ph.D., Cornell. Associate Professor, Cornell. (Social Sciences)
- \*†BRUNSWIG, LILY, Ph.D., Columbia. Psychologist, National Institutes of Health, Public Health Service, Federal Security Agency (stationed at Psychiatric Clinic, Juvenile Court, District of Columbia). Taught in Fisk. (Social Sciences)
- \*†BUCKLEY, JAMES L., LL.B., Georgetown. Assistant Director of Personnel, USDA. (Public Administration)



- \*†BURROUGHS, ROY J., Ph.D., Michigan. Principal Agricultural Economist, Division of Agricultural Finance, Bureau of Agricultural Economics, USDA. Taught in Michigan, Fort Huron Junior College, and Michigan State. (Social Sciences)
- †BUTLER, K. A., B.S., Minnesota. Assistant Chief in Charge of Administration, Bureau of Animal Industry, Agricultural Research Administration, USDA. (Public Administration)
- \*CADMUS, WALTER G., JR., B.S., Kansas. Architectural Engineer, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, USDA. (Technology)
- \*CALDERWOOD, HOWARD B., Ph.D., Wisconsin. Specialist, International Organization, Division of United Nations Economic and Social Affairs, Department of State. Taught in Ohio, Wisconsin, and Michigan. (Social Sciences)
- †CALLAN, J. A. C., M.S., Union College. Chief, Standards Coordination Branch, Airport Engineering Division, Office of Airports, Civil Aeronautics Administration, Department of Commerce. Taught in Union College and Alabama Polytechnic. (Technology)
- \*CANNON, EDWARD W., Ph.D., Johns Hopkins. Assistant Chief, Applied Mathematics Division, National Bureau of Standards, Department of Commerce. Taught in Johns Hopkins and Delaware. (Mathematics and Statistics)
- \*†CAVIN, JAMES P., Ph.D., Harvard. Head, Division of Statistical and Historical Research, Bureau of Agricultural Economics, USDA. Taught in University of Puerto Rico and Catholic. (Social Sciences)
- \*CHACE, FRED M., Ph.D., Harvard. Geologist, Mineral Deposits Branch, U. S. Geological Survey, Department of Interior. Taught in Brown and Harvard. (Physical Sciences)
- †CHAMBERS, THOMAS B., C.E., Alabama Polytechnic. Chief, Engineering Division, Soil Conservation Service, USDA. Taught in Alabama Polytechnic. (Technology)
- ‡CHAPLINE, ROBERT W., C.P.A. Assistant Chief, Examination Division, Farmers Home Administration, USDA. (Committee on Internal Audit)
- \*CHRISTIE, HAROLD E., A.B., Indiana. Assistant Director, Information Division, Farmers Home Administration, USDA. (Languages and Literature)
- \*†CHURCH, DONALD E., Ph.D., Michigan. Head, Transportation Research Section, Division of Marketing and Transportation Research, Bureau of Agricultural Economics, USDA. Taught in Michigan and Ohio. (Social Sciences)
- \*CHURCHILL, ETHAN D., B.S., Washington. Photographic Intelligence Officer, Headquarters, U. S. Air Force, Department of the Air Force. (Technology)
- \*CLARK, L. B., JR., Glass Technologist, Optics Division, Naval Research Laboratory, Department of the Navy. (Technology)
- \*CLARK, L. B., SR., B.S., California. Engineer, Nucleonics Division, Naval Research Laboratory, Department of the Navy. Taught in California, Catholic and San Francisco Research Laboratory. (Technology)
- \*†CLEMENTS, FORREST E., Ph.D., California. Head, Division of Special Surveys, Bureau of Agricultural Economics, USDA. Taught in California, Yale, and Oklahoma. (Social Sciences)
- \*†COBB, EDWARD S., Head, Specifications and Tests, Research and Development Department, Naval Photographic Center, Department of the Navy. (Technology)
- †COCHRAN, H. DEAN, B.S., Colorado A. and M. Chief, Division of Personnel Management, Forest Service, USDA. (Public Administration)
- †COCHRAN, WILLIAM G., M.S., Cambridge. Professor of Biostatistics, Johns Hopkins University. Taught in Iowa State and North Carolina State. (Mathematics and Statistics)
- †COFFIN, TRIS, A.B., DePauw. Washington Correspondent, American Broadcasting Company and Syndicate Columnist. (Public Administration)
- \*COLLINS, EMMETT B., B.B.A., Emory. Chief, Division of Audit, Office of Budget and Finance, USDA. (Office Techniques)
- \*COLNER, BERNARD J., A.B., Brooklyn. Cartographer, Division of Photogrammetry, U. S. Coast and Geodetic Survey, Department of Commerce. (Technology)
- \*COOK, RICHARD K., Ph.D., Illinois. Chief, Sound Section, Mechanics Division, National Bureau of Standards, Department of Commerce. Taught in Illinois. (Mathematics and Statistics)
- \*‡COOPER, JOHN C., A.B., Furman. Assistant Director, Office of Budget and Finance, USDA. (Committee on Internal Audit; Public Administration)
- ‡CORNELIUS, CARROLL, A.B., Illinois. Training Officer, Farmers Home Administration, USDA. (Committee on Correspondence Study and Extension Education)
- \*CORNFIELD, JEROME, B.S., New York. Chief, Research Studies Unit, Biometrics Section, National Cancer Institute, National Institutes of Health, Public Health Service, Federal Security Agency. Taught in American. (Mathematics and Statistics)
- \*CORNSEWET, ALBERT C., Ph.D., North Carolina. Chief Clinical Psychologist, Mental Hygiene Clinic, Washington Regional Office, Veterans Administration. Taught in Brown and North Carolina. (Social Sciences)
- †CORRELL, LYNNE M., M.S., Iowa State. Personnel Officer, Region 7, Forest Service, USDA. (Public Administration)

- \*CORSON, JOHN J., Ph.D., Virginia. Assistant Business Manager, The Washington Post. Past President, American Society for Public Administration. Taught in Virginia and American. (Public Administration)
- \*†COUCH, VIRGIL L., B.S., Kentucky. Director of Personnel, Economic Cooperation Administration. (Office Techniques; Public Administration)
- \*COWING, AMY G., B.A., George Washington. Extension Educationist, Division of Field Studies and Training, Extension Service, USDA. (Languages and Literature)
- †CROW, WILLIAM C., M.A., Chicago. Director, Marketing Facilities Branch, Production and Marketing Administration, USDA. Taught in Alabama Polytechnic. (Social Sciences)
- †CRUMP, WARREN C., B.C.E., George Washington. Deputy Chief Engineer, Hydrographic Office, Department of the Navy. Taught in George Washington. (Technology)
- \*CULLINAN, FRANK P., Ph.D., Chicago. Assistant Chief, Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, USDA. Taught in Purdue. (Biological Sciences)
- ‡CURRIE, DANIEL A., B.S., Davidson. Training Specialist, Division of Training, Office of Personnel, USDA. (Committee on Correspondence Study and Extension Education)
- †CURRIER, L. W., Ph.D., Syracuse. Geologist, U. S. Geological Survey, Department of Interior. (Physical Sciences)
- †CURTISS, JOHN H., Ph.D., Harvard. Chief, National Applied Mathematics Laboratories, National Bureau of Standards, Department of Commerce. Taught in Cornell and Harvard. (Mathematics and Statistics)
- \*D'ALESSANDRO, ALFRED, C.P.A., M.A., Harvard. Federal Trade Commission. Author of "Foundation of Accounting." (Public Administration)
- \*†DALY, JOSEPH F., Ph.D., Princeton. Statistician, Bureau of the Census, Department of Commerce. Taught in Catholic and Princeton. (Mathematics and Statistics)
- \*DANTZIG, GEORGE B., Ph.D., California. Mathematical Advisor to the Comptroller, Department of the Air Force. Taught in California and American. (Mathematics and Statistics)
- †DAVIS, FLOYD E., M.S., Ohio State. Acting Head, Livestock and Wool Division, International Commodities Branch, Office of Foreign Agricultural Relations, USDA. (Social Sciences)
- †DAVIS, JOHN CORDON, M.S., Ohio State. Economist, Council of Economic Advisers, Executive Office of the President. Taught in Michigan State. (Social Sciences)
- †DAVIS, LOA E., M.A., Columbia. Extension Economist, Extension Service, USDA. (Social Sciences)
- †DAVIS, RAYMOND, Chief, Photographic Technology Section, National Bureau of Standards, Department of Commerce. (Technology)
- †DEERING, ARTHUR L., D.Sc., Maine. Dean, College of Agriculture, University of Maine. (Social Sciences)
- \*DELANEY, MAURICE S. A., Cartographic Engineer, U. S. Hydrographic Office, Department of the Navy. (Technology)
- °†DELOACH, D. BARTON, Ph.D., California. Assistant Head, Division of Marketing and Transportation Research, Bureau of Agricultural Economics, USDA. Taught in California and Oregon State. (Social Sciences)
- \*DE MARNE, HENRI, Baccalaureat, Université de Paris. Instructor, University of Maryland. (Languages and Literature)
- \*†DEMING, W. EDWARDS, Ph.D., Yale. Adviser in Sampling, Bureau of the Budget. Taught in Wyoming, Colorado, and Yale. (Mathematics and Statistics)
- \*DEVEREAUX, MARY C., M.A., Michigan. Technical Librarian, Atomic Energy Commission. Taught in St. Catherine, Wisconsin, Florida State, and Catholic. (Languages and Literature)
- ‡DEVRIES, P. H., M.A., Michigan. Chief, Commodity Programs Division, Information Branch, Production and Marketing Administration, USDA. Taught in Michigan State. (Committee on Publications)
- ‡DEXTER, WAYNE V., B.S., Kansas State. Information Specialist, Division of Economic Information, Bureau of Agricultural Economics, USDA. (Committee on Information)
- †DIVINE, WILLIAM R., J.D., George Washington. Chief, Management Appraisal Group, Division of Administrative Management, Bureau of the Budget. Taught in American. (Public Administration)
- \*DOLCH, ABBEFORD S., Transportation Rate Analyst, Anti-Trust Division, Department of Justice. (Social Sciences)
- †DONOVAN, HENRY A., Assistant Chief, Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, USDA. (Office Techniques)
- †DORN, HAROLD F., Ph.D., Wisconsin. Chief, Biometrics Section, National Cancer Institute, National Institutes of Health, Public Health Service, Federal Security Agency. (Mathematics and Statistics)
- \*DOYLE, MABEL HUNT, A.B., Wellesley. Administrative Officer, Naval Research Reserve, Office of Naval Research, Department of the Navy. (Languages and Literature)
- \*DUCOFF, LOUIS J., Ph.D., American. Labor Economist, Division of Farm Population and Rural Life, Bureau of Agricultural Economics, USDA. (Social Sciences)

- \*DUNEGAN, JOHN C., M.S., Arkansas. Senior Pathologist, Division of Fruit and Vegetable Crops and Diseases, Bureau of Plant Industry, Soils and Agricultural Engineering, Agricultural Research Administration, USDA. (Biological Sciences)
- \*EARDLEY, EDWARD P., E.E., Utah. Chief Engineer, Division of Power, Office of the Secretary, Department of Interior. (Technology)
- \*EDWARDS, EVERETT E., M.A., Harvard. Agricultural Historian, Bureau of Agricultural Economics, USDA. Taught in Northwestern, Missouri, Miami, Minnesota, and Catholic. (Social Sciences)
- †EDWARDS, FORD, Ph.D., Yale. Director of Accounts and Cost Finding, Interstate Commerce Commission. Taught in Southern California. (Social Sciences)
- \*EDWARDS, GENIANA R., M.A., American. Chief, Editorial Section, U. S. Tariff Commission. (Languages and Literature)
- \*†ELLIOTT, FOSTER F., Ph.D., Wisconsin. Associate Chief, Bureau of Agricultural Economics, USDA. (Social Sciences)
- †ELLSWORTH, GERMAN, LL.B., George Washington. Assistant to the Commissioner—Management Planning, Bureau of Reclamation, Department of Interior. (Public Administration)
- †ELTING, ERWIN C., M.A., Missouri. Associate Chief, Office of Experiment Stations, Agricultural Research Administration, USDA. Taught in Missouri. (Social Sciences)
- \*†EMERY, WALTER B., Ph.D., Wisconsin. Chief, Renewals and Revocation Branch, Federal Communications Commission. Taught in Oklahoma, Wisconsin, and Ohio State. (Languages and Literature; Social Sciences)
- \*†ENGBERG, RUSSELL C., Ph.D., Columbia. Chief, Economic and Credit Research Division, Farm Credit Administration, USDA. Taught in Iowa State, Minnesota, and Idaho. (Committee on Internship Cooperation; Social Sciences)
- \*†ENSINGER, DOUGLAS, Ph.D., Cornell. In Charge, Educational Research Section, Extension Service, USDA. Taught in Cornell and Columbia. (Social Sciences)
- \*ESHBACH, CHARLES E., B.S., Massachusetts. Information Specialist, Extension Service, USDA. (Social Sciences)
- \*EVANGELIST, ALARIC, M.A., Maryland. Informational and Editorial Specialist. Taught in Maryland. (Languages and Literature)
- \*EVANS, LEWIS S., M.S., Nebraska. Project Analyst, Agricultural Research Administration, USDA. (Biological Sciences)
- \*†EVERETT, GEORGE H., C.E., Clarkson College of Technology. Cartographic Engineer, U. S. Coast and Geodetic Survey, Department of Commerce. Taught in American Institute, Bolivia. (Technology)
- \*FAULDS, ARTHUR H., M.S., Syracuse. Photogrammetric Engineer, Engineer Research and Development Laboratories, Department of the Army. (Technology)
- †FEE, WILLIAM E., LL.B., Georgetown. Assistant Chief, Administrative Services Division, Soil Conservation Service, USDA. (Public Administration)
- \*FINDLAY, JOSEPH P., A.B., George Washington. Assistant Chief, Division of Classification, Office of Personnel, USDA. (Public Administration)
- †FINNEY, LEOTA S., B.S., George Washington. Architect, Bureau of Human Nutrition and Home Economics, Agricultural Research Administration, USDA. (Technology)
- \*FISCHER, ALFRED W., C.E., Valparaiso. Naval Architect, Bureau of Ships, Department of the Navy. Taught in Valparaiso and George Washington. (Technology)
- \*FITZPATRICK, RICHARD S., B.S., Marquette. News Editor, Air Bulletin Section, Basic Information Branch, International Press and Publications Division, Office of International Information, Department of State. (Languages and Literature)
- \*†FLAVIN, THOMAS J., LL.B., Georgetown. Judicial Officer, Office of the Secretary, USDA. Taught in Georgetown. (Public Administration)
- \*FONFARA, EDWARD W., Cartographic Engineer, U. S. Navy Hydrographic Office, Department of the Navy. (Technology)
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